An E-learning System for Digital Photography

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ABSTRACT

Electronic learning (E-learning) has been one of the most applicable concepts in Information Technology (IT) since it is a typically more affordable, persistent, on-demand and self-learning system. The notable developments in IT and communication facilities have enabled us to implement several concepts of E-learning in various fields of studies in different levels.

Photography is an extremely popular hobby but it can be a very expensive one as well. However, recently decreasing prices for digital cameras (like the other electronic devices) increased the demand on photography. Therefore, photography education is gaining popularity since there are a lot of techniques and methods associated within the field.

In this project, an online E-learning system for digital photography field is developed. The key feature of this proposed system is its realistic approach, which makes it closer to practical digital photography learning system, having a user-friendly interface. It will also be more adaptive for the students and lectures to cover all materials similar to the regular courses done in face-to-face classes. This research is developed based on the results obtained from the previous study which has been done by Kaveh Rasouli as the co-author: "The Case Study of Designing an Artistic Course as a Part of E-Learning Program" [7].

This system targets students in different photography fields such as portrait photography, documentary photography and fashion photography, with different levels of education varying anywhere from "basic" to "professional". Furthermore, a

Voting Online Photography Gallery (VOPG) is included in our system and this gallery is designed to be able to create a social network between the users. One of the advantages of this user-activity is to let the users evaluate and rank student photos.

This system will be designed to satisfy two user groups, which are:

- Users who use mobile devices and entry level photography equipment and,
- For photography and professional photographers with Professional Digital Cameras and Equipment.

Keywords: E-learning, VOPG, Digital Photography Learning

ÖZ

Elektronik öğrenme (e-öğrenme) daha düşük maliyetli, tutarlı, talep doğrultusunda ve kendi kendine öğrenmeye imkan veren bir sistem olarak, bilgi teknolojilerinde (BT) en uygulanabilir kavramlardan birisi haline gelmiştir. BT'nin ve iletişim araçlarının hızla gelişmesi, E-öğrenme kavramının çeşitli alan ve seviyelerde çalışılmasına olanak sağlamıştır.

Fotoğrafçılık çok popüler bir hobi olmasına rağmen çok da pahalı olabilmektedir. Ancak, son zamanlarda kamera fiyatlarının düşmesi (diğer elektronik aletler gibi), fotoğrafçılığa talebi artırmıştır. Bu yüzden, fotoğrafçılık eğitimi değişik teknik ve yöntemlerle de bağlı olarak, zaman içerisinde daha popüler hale gelmiştir.

Bu projede, dijital fotoğrafçılık için online bir E-öğrenme sistemi geliştirilmiştir. Sistemin farkı, gerçekçi bir yaklaşıma sahip olmasıdır. Bu şekilde uygulamalı dijital fotoğrafçılık öğrenimine daha yakın ve daha kullanıcı dostu bir arayüze sahip hale gelmiştir. Bu fark, yüz yüze ders ortamına alışmış öğrenci ve hocaların sisteme daha kolay uyum sağlayabilmesine de olanak sağlamaktadır. Bu araştırma, "Vaka çalışması; E-öğrenme Programının parçası olarak Sanatsal bir Kurs Hazırlama"[7] çalışmasının yardımcı yazarı Kaveh Rasouli'nin önceki araştırmasından elde edilen sonuçlara bağlı olarak yapılmıştır.

Bu sistem, portre fotoğrafçılığı, belgesel fotoğrafçılığı ve moda fotoğrafçılığı gibi farklı alanlarındaki, farklı seviyelerde eğitimler almış "temel" fotoğrafçılıktan "profesyonel" seviyeye kadar tüm öğrencileri hedef almaktadır. Bunun yanında sisteme Online Fotoğraf Oylama Galerisi (OFOG) özelliği de dahil edilmiştir. Galeri

kullanıcılar arasında sosyal bir ağ yaratmayı amaçlamaktadır. Galerinin avantajlarından birisi kullanıcıların öğrenci fotoğraflarını değerlendirmesine imkan vermesidir.

Sistem iki gruba hizmet etmek için tasarlanmıştır. Bu gruplar:

-Giriş seviyesi kamera veya mobil cihazlara sahip kullanıcılar ve,

-Profesyonel ekipmana sahip profesyonel fotoğrafçılar.

Anahtar kelimeler: E-Öğrenme, OFOG, Dijital Fotoğrafçılık Öğrenimi

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ANOVA	Analysis of Variance
DSLR	Digital Single Lens Reflex
CMS	Content Management System
DMS	Digital Management System
HDR	High Dynamic Range
IT	Information Technology
ICT	Information Communication Technology
LMS	Learning Management System
MMI	Mahe Mehr Institute
NYP	New York institute of Photography
SCO	Sharable Content Objects
SLR	Single Lens Reflex
SMD	System Development Methods
SMS	Social Management System
TIT	Tehran Institute of Technology
VSM	Viable System Model

Chapter 1

INTRODUCTION

1.1 E-learning

Using the Internet and the other information technologies as learning tools is now spreading rapidly in educational systems. Rapid expansion of Internet technologies and learning systems has made E-learning an important form of education in this context. Features of technology provide many opportunities for education in new learning environments by allowing individuals to learn at any time at any place to overcome some obstacles of learning environments.

Many institutions are now offering online education, but so far the concentration has been on theory-based subjects like economy, history, physics, science, law, business administration, etc. The aim of this research is to attempt to examine psychomotor online learning (skill) used for acting, sporting, singing, typing, and art & design skills as mentioned by Thelma & Elizabeth, (2001) [5].

Education in general and art education in specific is not just information transmission. In education, the most significant consequence for the learner is not his deep and accurate learned knowledge, but methods of knowledge acquisition, certain mental habits, testing methods and theoretical positions (Rasouli, 2012) [8].

There is no doubt that education is one of the most basic demands of humans. Distances and quality of education are significant factors for educators. Students not only seek to learn a topic with the least amount of cost, but also with the highest quality. Previously, these demands could not be gathered in one place. The best quality of education could be found only in a limited number of places with high costs.

Today, Internet, social networks, and developing technologies have changed our world notably. One of the most crucial tasks is to improve the quality of education. As the number of people interested in higher education is increasing, the current infrastructure seems inadequate and somehow inefficient. The economic crisis should also be added to the current issues as the power of universities for financially supporting students and researchers is decreasing.

Nevertheless, improvement of the current education system is challenging. Firstly, increasing universities' capacities means extra cost. Construction of more face-to-face education facilities such as new classrooms, laboratories and departments may be necessary and few governments who can provide a part of this cost in many countries.

Secondly, the quality of education should be improved within the competitive atmosphere of an educational system. However, this requires finding and hiring experienced and knowledgeable lecturers, which is also another difficult issue to handle.

The above-mentioned factors definitely have encouraged education researchers to search for a new generation of education, namely E-learning systems. These systems are more capable of being controlled in terms of the quality of material and teachings, cheaper to be established in most subjects and more affordable for customers.

1.2 The Main Steps and Approach of Designing E-Learning System for Digital Photography

The following chapters are dedicated to our approach to design a digital E-learning photography program. Firstly, we discuss the pros and cons of face-to-face and E-learning programs. Secondly we describe our methodology, which is based on organizational cybernetics as a system analysis tool. Thirdly, we present the design chart of the system, and finally, we discuss some part of the details of the implementation.

On the other hand, psychomotor skills are necessary if one is to teach and learn in art & design. According to Bloom's Taxonomy in (Elisabeth & Darin (2001)) [5], psychomotor skills use our face-to-face features to obtain cues needed to guide our sensory motor activity to perform particular actions. This can also be performed under the guidance of a trainer.

Nowadays, most people use photography in their daily lives, and it is not like the old days where only professionals could take pictures. Technology has been developed, vastly letting people work easily with photography techniques and helping them in memorizing their special moments in their lives. As a matter of fact, there are and there will be more and more potential candidates for learning the tricks of good photography.

1.3 The Photography E-learning System

The question of whether E-learning systems are also applicable for training and experimental courses or not, is still difficult to address. As a matter of fact, nearly all the experts in those matters believe that distance E-learning materials do not have much influence on student's progress. Nevertheless, the author of this work [7] strongly believes that there is always a way that any subject can be taught via E-learning systems. This claim is based on the recent and future developments in multi-media systems and technological devices in communication systems such as genius mobile phone and gadgets or Google glasses.

In this thesis, we will generally discuss our case study in designing an E-learning program in the theoretical-training field of digital photography. We explain how a digital photography E-learning program can be designed in a way that the program will not only be competitive for face-to-face programs, but also be a potential first choice for every person who is interested in the photography field.

We have specifically chosen photography as a starting point, for two reasons: Firstly, photography is not only an artistic topic, but it is also a professional tool which is frequently utilized in engineering, marketing, basic sciences, medicine, modeling, and other areas of knowledge. Therefore, by design and implementation of an E-learning photography program, there would be a large number of target customers. Secondly, our experience in E-learning programs in TIT (Tehran Institute of Technology) shows that clients are more interested in photography compared to the other field such as Visual Arts. In this study, a new proposal is made in order to approach learning digital photography.

There are a few benefits to having our system implemented, which are listed as follows. First, the users of the system will be able to practice at any point in time by accessing the gallery or the lecture notes as well as additional information such as the camera type (by Using Camera Detection Software) due to the fact that the system is widely available for use at home.

Secondly, the users are able to receive feedback and suggestions via the system concerning their skill level without delays. Thirdly, there will be benefits to the master (trainers) by using the system. In addition to what we mentioned above, the teacher or master can remotely provide feedback and advice to students by accessing their records, which are kept in a database. The level at which students can adapt to the system can be further analyzed after a certain amount of time to increase their skill level. Previously, all knowledge about the skill of the users were kept strictly in the head of the teachers and there was no way to document such data.

Chapter 2

LITERATURE REVIEW

2.1 Prior Work on Related Issues

We have specifically chosen the major of photography as a start point, which has been chosen by TIT group for two reasons. Firstly, photography is not only a hobby, but it is also a professional tool as indicated before. Therefore, by designing and implementing an E-learning photography program, there would be a huge number of target customers because of the topic's importance. Furthermore, and as the second reason, our experience in E-learning programs in TIT (Tehran Institute of Technology) [7] shows that people are more interested in photography compared to the other majors such as Media. Nowadays, most people use photography in their daily lives, and it is not like the old days where only professionals could take pictures. Technology has been developed vastly letting people work easily with photography techniques and helping them in memorizing their special moments in their lives. As a matter of fact, there are and there will be more and more potential candidates for learning the how to compose better photos.

Art-related E-learning courses have been considered as the title of some recent researches, [8, and 15]. However, there has been a lack of serious work in this field since the subject came to existence in the literature.

One of the exceptions is Nicephor [12], “a project funded by Swiss virtual educational campus and targets at creating a virtual learning or mixed web-based learning system for forensic and scientific photography beside microscopy. The aim is to arrange a sequence of online modular courses consistent to the educational requirements of graduate theoretical platforms. Furthermore, this platform could be used in the environment of continuing instructive schedules” [12].

Nicephor [12], although aims at a more detailed and technical program, has a good organizational structure in course design, education, and assessment of students. It also converges to any level of education, from bachelor to doctorate. Moreover, it lets other institutions to upload new or optimize existing materials for future or present usage. Though the aim of this study is much broader in terms of the materials (general digital photography program as a tool for both artistic and non-artistic purposes) and exclusiveness of the service (our system will be used by one institution), the organization and the architecture of our program, and the offered courses can be followed.

The closest work in the literature to our group’s aim is the work by TIT group [7]. An online photography course was established in TIT consists of video connections with lecturers. An assessment system was considered as a survey in order to get feedback from the students so that improvement of the system will be achievable with ease. Furthermore, several evaluating factors were considered so that apart from students’ comments, system’s managers will be able to decide about the course condition the most vital of which was number of registered students for the next semester. The course was only offered within Iran, however usable for all Farsi speakers within the globe.

Moreover, there was no adaptable material for students in terms of the way of teaching but only the time period of learning and teaching, which was up to learners' choice.There were also some issues in terms of implementation, and the quality of the course the most important of which was the quality of Internet in Iran, which was named by many course attendances.

Art-related E-learning courses have been considered as the title of some recent researches, [8, and 15]. In Malaysia, the E-learning methodology has been studied in order to explore its potential in establishing a line drawing course. The prototype was designed based on, System Development Methods (SDM).

In fact, the authors believed that "Some techniques and practices that work well in a conservative classroom will not transfer straight to an equally effective distance learning experience. However, potentials arise for latest techniques of teaching and ways of relating to traditional approaches" [15]. This system has several features based on the facts that student that have a lot more non-face-to-face learning hours to achieve the effectiveness and quality time for self-development.

Other sources can be efficiently searched on behalf of student in order to successfully and efficiently finalize their tasks. A joyful and a fun atmosphere is created by sharing the knowledge when conversing online with other artists or students. Their method of research has several steps including observation, interviews, and survey and testing [15].

An E-learning model for collaborative studying of calligraphy has been also presented by Rasouli, A. (2012) in Iran [8]. The author has illustrated the

disadvantages of contemporary calligraphy education, and based on that, utilizing the concepts of collaborative learning and E-learning, he has proposed an abstract model. Although the model seems to reach calligraphy-related goals, its goals can be simply illustrative for any sort of artistic course. Cultivating problem solving skills, cultivation of decision making, nurturing creativity, cultivating virtues and moral values, cultivating self-confidence, and cultivating curiosity have been named as the model goals seeking of which demanded highly efficient online technologies.

The vital part of their work was evaluation part, which includes participation, self-assessment, creating innovative works, and measurement by classmates. Indeed, they believed that "Students have access to materials and resources and different people at the electronic participatory learning environment and they will acquire different skills through participation in the environment like: search, information management, power to establish relationship and critical thinking. Thus, the evaluation method proportional with this environment should consider critical thinking, establish relationship, decision-making power, responsibility, information management skills in addition to subject learning"[8].

These aspects in student's assessment are quite fruitful in any sort of educational system, and will be used in our system's assessment too. However, the model has been introduced as a supplement to traditional calligraphy education in one just country whereas we seeking to establish a general photography program which is completely online for global purposes [8].

2.2 Learning Digital Photography

There are three most important categories of digital photography instruction are:

- Self –Photography Training
- Learning digital photography methods and instruments
- Digital photography tools and methods to prepare the digital editing of photography

One of the important issues in training part is the need for practicing factor. Actually the basic foundation of learning digital photography is that learning this skill and technique is impossible without homework and self-practices. By professional suggestions, homework for digital photography training must be separated into three parts, which is: (Technical, Theory and History, Practices). Firstly, we need to learn about the body of digital and manual camera as part of hardware practicing. This part is useful to learn how people can work with the camera and the details of the body camera learning and some important knowledge about (lights, technical discussion and advanced photography). Secondly, there is a need to learn the history of digital photography and the practical learning, when students achieve the imaginary part its mean that learning is finished and they must move to the topic of learning from.

One of the important aims of this research is finding out the potential of digital photography E-learning in the implementation of photography courses. This requires some observation of interviews, survey and seminars.

This research observed digital photography with differing types and subjects in contents when E-learning is applied to the photography courses. The research also took into consideration user capabilities, and user's knowledge base on computers, which determines their level of expertise in computing.

For the observation part we have conducted a paper survey, formal interviews and seminars different institutes: Tehran Technical Institute and Mahe Mehr Institute (MMI) as one of the most popular art and photography teaching private institutes in Iran. In the summer of 2013, 30 experts and 250 students from Mahe Mehr Institute and Tehran Technical institute attended the seminars that were held at the Center Branch of Tehran Technical Institute, Iran. 15 experts and 150 students joined the paper surveys and formal interviews.

2.3 Previous Studies on Multimedia Tools for Online Courses

There are several recent multimedia studies applicable in photography E-learning programs. In [2], it has been indicated that multimedia instructional materials are useful for making a combination of verbal and pictorial material such as video, audio and animation, through auditory and visual channels. Although there are extensive researches on the subject of how to combine words and pictures in presentations, there has not been a descent work on how to present a single presentation using only static-dynamic graphics or words. The paper focused on comparing realistic and schematic-dynamic graphics, and on comparing male and female narrations on the quality of learning.

This study has a useful review on the prior works related to combined presentations, and has stated many fruitful instructions:

1. Spatial contiguity Principle: related pictures and texts should not be placed approximately far from each other on the page or screen.
2. Temporal Contiguity Principle: Texts and Pictures, which are related to each other, should be presented simultaneously rather than one by one.
3. Modality Principle: Words, which are accompanying pictures, should be in narrative form rather than texts.

For single presentations, there are some guidelines other, which are:

1. Coherence Principle: interesting but irrelevant pictures should be excluded from the presentation.
2. Personalization and Words Principle: Learners learn more deeply when texts are in conversational style rather than formal style, and learners learn better when voice is in standard-accent rather than mechanical or foreign accent.

For assessing the effects of different multimedia materials on emotions and learning performance for visual and verbal style learners, Chen et al [2] searched for further guidelines to design single presentations using only graphics or narrations. The results suggest that:

1. The conceptual and schematic graphics lonely are more effective for creating face-to-face class environment.

2. Male voice narration has more influence in learners' performance rather than Female narration (However, this finding seems to be dependent on the culture of the society).

For the first result, according to the principles mentioned above, it has been predicted before conducting the research that extra and irrelevant materials can be harmful in learning process. As realistic graphics have always extra and irrelevant information naturally, schematic graphics, which included only fruitful information, was predicted to be more effective in the learning process, and this research has confirmed this prediction.

The authors of [4] searched for answers to two questions:

Question 1:"What are the changes in vocabulary learning among students who received the small, medium and large computer screen multimedia instructions? "

Question 2:"Is there an improvement in vocabulary learning between using only the text beside the text-with pictorial annotation method of instruction? " [4].

The data were analyzed to evaluate the difference of the small, medium and large screen sizes regardless of multimedia presentation modes. Analysis of variance (ANOVA) study related to the achieved data from experiments show that students that receive instructions on either a large or a medium screen tend to achieve a higher score than those who received the instructions on a smaller screen with the retention test and the post-test.

Data used in the experiment are split into two groups, one being “using text with pictorial annotations” and the other being “using text only” in order to comply with the second research question. The overall differences between the two groups were minimal. As stated, groups determined by screen sizes were separated into the text with pictorial annotation and text only. A t-test, which is statistical hypothesis test and which the test statistic follows a Student's t distribution if the null hypothesis is supported, was performed on the separate groups, which proved that there were yet again no significant differences between the separated groups with the same screen sizes.

Specifically speaking, the mean of students that:

1. The students had taken their vocabulary studies on a large screen achieved better scores than those students that utilized smaller screens to take their tests on. The difference is apparent on both the retention tests and the post-test.

2. The students who is Using text by pictorial annotation coaching and the text only method made little to no difference with the same screen size groups.

There are a few limitations of this study. First, this study was designed to investigate the effectiveness of screen size on a computer monitor rather than on mobile devices. Thus, the findings from this work may not be generalized to more interactive mobile learning, which can promote rich vocabulary learning experiences. In addition, there are some limitations in the test instrument. The data of this study were based on repeated measurements using the same test.

The results in the measurements should be interpreted with caution because of the possible familiarity of some questions to the students in the study. For instance, the students' familiarity and recognition of words in the repeated measures design may have affected test scores and even reduced the effectiveness of graphics in the results" [4].

One the other study is on assessing the consequences of different multimedia tools on material and acquiring presentation for graphic and verbal style learners [2].

This study searched for whether different multimedia materials causes significant differences on emotion and learning implementation for learners with graphic and verbal mental styles, and furthermore, it tests the relationship between learning performance and emotion. Three different tests were held for two sorts of students who have learned variant multi-media materials and three different hypotheses were presented in order to be investigated:

Hypothesis 1: Are there significant differences in positive and negative attachments when visualizers and verbalizers are presented with different multimedia materials for learning?

Hypothesis 2: Are there significant differences in "learning performance" with time and repetition analysis when verbalizers and visualizers are presented with different multimedia materials for learning?

Hypothesis 3: Are there significant relationships in learners' attachments and learning performance when verbalizers and visualizers are presented with different multimedia materials for learning? [Chen, 2012] [2].

The learning performance had a significant effect regardless of even if learners were presented with video-based multimedia material. It is obvious that video-based multimedia is a more suitable means of visual presentation because of the dynamic multimedia materials that are apparent in videos and annotations alike. Experimental results indicate that there is a strong correlation between learning and emotional performance and video-based multimedia material that raises interest.

There are some limitations in this study. First, "this study uses a single topic and single set of multimedia materials, such that research results cannot be transferred readily to other learning topics and multimedia materials" [2]. Secondly, this study focused only on a particular age group of children. Hence, research results cannot be applied to other age groups with different cognitive skills and affective experiences.

The principles presented in [2], although been mentioned as literature review and not as a direct finding, have an important influence in designing E-learning materials: avoiding extra voices or pictures, presenting related texts and pictures simultaneously, and utilizing narrations instead of texts. Nevertheless, paying attention to single material presentation in E-learning does not imply a perfect guideline since there some subjects that cannot be taught in all details with single presentation.

If we are supposed to use narrations more than texts, then the impact of the study is less than expected. However, there are some subjects, which may utilize the results of the so-called research in their E-learning program one of which is of course vocabulary learning itself.

The study in [2] has the highest influence on our E-learning program. In fact, the key obstacle is how to design multimedia materials in order to stimulate the student interest and to have a depth of understanding. If a multimedia presentation can be designed in an online fashion which encourage student most to understand all the concepts without having a teacher or classmate physically present, then the E-learning material can be considered successful.

There are some suggestions in the discussion part associated with further researches, which are as follows:

1. The comparison of "multi-media presentation" and "face-to-face presentation" in an art related topic, apart from the gender, and the age of students.
2. The limitations of pictures that can be used in face-to-face presentation in history of art courses in Eastern countries.
3. The influence of combination of multi-media, and classical presentation in students' performance.

Chapter 3

BASIC PROPERTIES OF THE ONLINE SYSTEM DEVELOPED

The aim of this study is firstly to find out the weak points, disadvantages, and limitations of face-to-face photography programs in universities or other educational institutes. This will help us to design an E-learning program that is capable of competing with face-to-face programs.

Secondly, we will discuss the weak points of E-learning photography programs, which will enable us to improve their utilization for advance communication and education technologies.

3.1 Learning Subject with Master

A lot of individuals are not being taught photography at universities, schools training centers and even at homes. There is a level of supervision when being taught at universities or schools where the supervisor manages many students at the same time. Generally, in the classroom environment, students must perform a specific task repeatedly until the instructor can allocate a certain amount of time to the student for feedback and suggestions. A problem for this method is that the student or the participant may or may not know if they are approaching the task in the right way or not until they receive the feedback from the instructor. Even after receiving feedback, students can still be confused about the task at hand and continue to repeat the task unsuccessfully.

As a result, students continue to learn until they are provided with enough feedback from the master to improve their skills and knowledge about photography. Students who do not get much attention from the master within a certain amount of time, they will quickly lose focus, feel neglected or in extreme cases, lose interest and abandon the photography classes altogether.

3.2 Self -Study

Some people practice digital photography at home by reading photography books written by experts or watch learning videos online. However, this is not an efficient way to learn photography or any arts major field, as feedback from the master is non-existent and the participant may not realize that they are completely performing the tasks in a wrong way.

Another difficulty of the self-learning model is that there is no chance for a group interaction between classmates, which is an integral part of learning efficiently in the art field. When learning photography, it is very important to learn about all the instruments involved with the subject such as the lighting or other peripherals. In order to learn such light courses, it is important that a partner keep light for you to set it in the best condition for you to capture best image. Unless it is rehearsed with a partner, it is almost impossible to learn these techniques without performing them.

3.3 Organization of Interview and Surveys

In the interview section, an interview was arranged with art photographer, art and design, engineering and an architecture student. The interview was conducted with topics in mind such as the amount of knowledge or the experience that the photographer had in the classes. The questions asked during the interview is about earlier learning photography experiences, which included both E-learning and face-

to-face classes and to identify how students perceive this field by using past experiences in photography class or in any past E-learning experiences. In the survey part we explore the potential and performance of the people about learning art and photography subject through the E-learning.

The web page on Facebook is used to get more results in the seminar part, we try to achieve answers to 12 important question and we will discuss about the result in the survey part and explore the potentials of E-learning in the photography courses. Many methodologies were used for designing the interface part and the development part by designing, planning, analyzing and testing.

Those who are concerned about the art and science education need to collaborate and tackle this issue in order to teach digital photography through the E-Learning system to implement such as program. We try to use the online system to create an effective learning tool that is mandatory for art skill and practice courses. Details and information on system tools are explained in the architecture of the photography E-learning system. The conceptual design of the photography E-learning program is based on the disadvantages of face-to-face programs.

Two different strategies could be used in order to obtain the pros and cons of face-to-face programs:

1. Analytical approaches
2. Data mining approaches

The second approach was applied in order to undermine the usual approach of teaching photography programs. Based on that, for three possible stakeholders of our system (students, experts and lecturers, gallery managers) three sorts of data gathering techniques were utilized (a paper based survey, a general seminar, a formal presentation).

The paper-based survey was designed in order to gather relative data from students and lecturers studying in face-to-face programs in private or public institutes and universities. One hundred and fifty students and fifteen experts completed the surveys. The survey results are mentioned below.

Design and implementation of photography E-learning program includes two steps as its name suggests. The design is based on the targets of establishing the program where targets themselves are based on the pros and cons of physical programs. Those pros and cons can be provided consulting students, experts (critics-artists), and gallery managers (Figure 3.1)

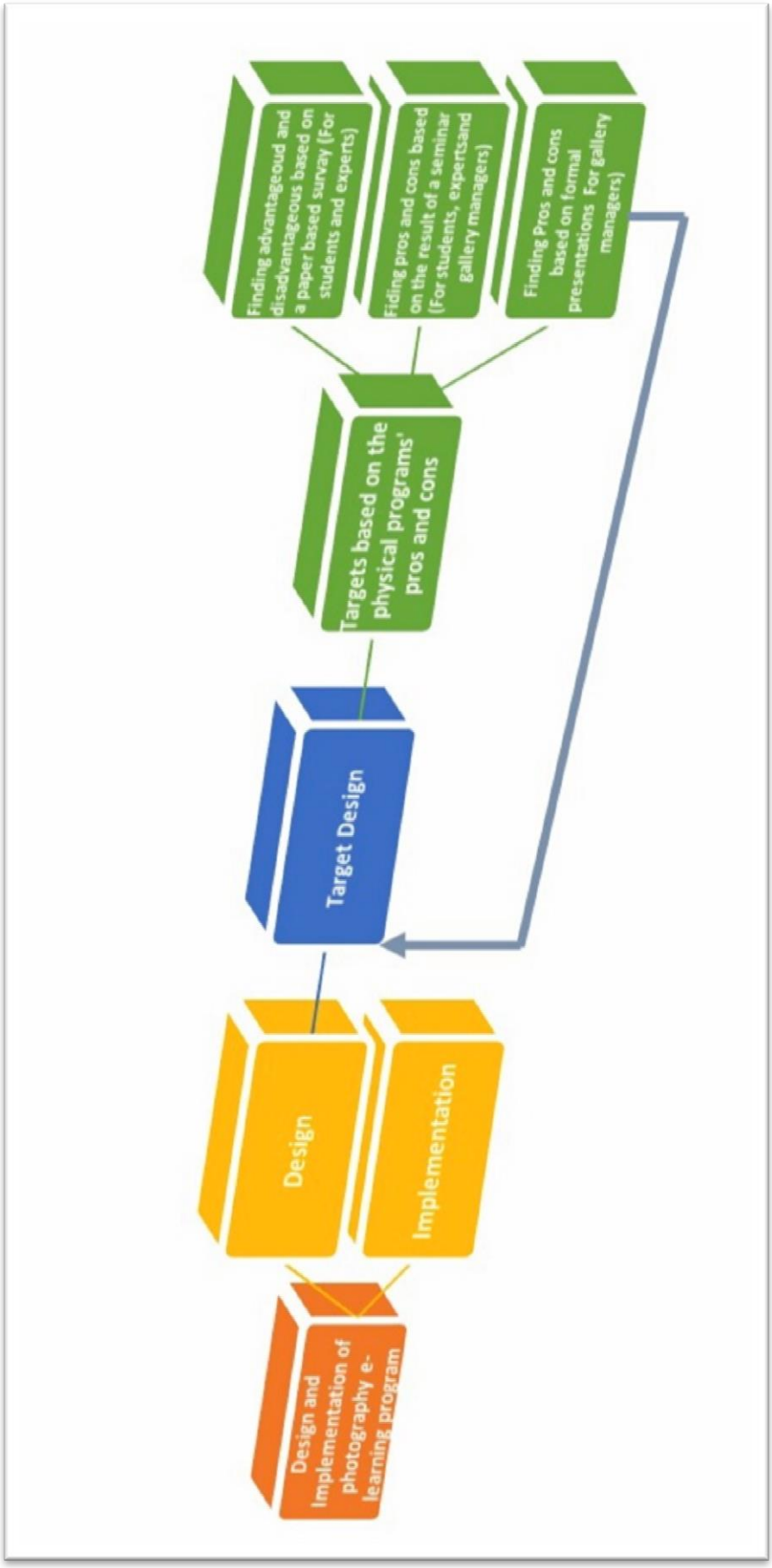


Figure 3.1: “The conceptual process” of E-learning system's design.

The information of the students took part in this survey is as follows:

Number of students: 150

Average age: 26, Max age: 36, Min age: 19, Median age, 25.5.

Male Surveyors: 61, Female Surveyors: 89.

The results, obtained are presented below:

1. The most important obstacles in face-to-face programs:

    a. The cost of transportation (money and time)
    b. Problems with lecturers
    c. Lack of time in courses (time limitation in teaching all the materials)
    d. Economic problems (purchasing relative materials, tuition fees, etc)
    e. Cultural problems (limitation in holding special courses such as "fashion photography", etc)

2. The most challenging problem of the alumni:
    a. Low job opportunity

3. The quality of students' assessment by examiners:

There are different comments on this question. Some were satisfied with the process while some showed dissatisfaction, as they believed that the process is not clear and organized at all, and it is very subjective.

4. Sub-majors such as fashion photography which are difficult to choose in the country where the survey is running:

In Iran, fashion and social photography were mentioned more than the others because of cultural and social limitations.

5. The influence of the lecturers and examiners of the system in introducing the students to the industry or art market:

In fact, all the students confirm that it is the system's responsibility to introduce talented students to the market.

6. Not all the students rely on E-learning courses for photography, mostly because of their lack of information about E-learning programs, or Internet's speed. As photography is not only a theoretic program, and has many experimental and actual courses, they think that this process is clearly challenging. They also believe that most of the learning process is occurring within the conversations among students and lecturers outside the courses. Therefore the presence of users is absolutely vital in learning arts. Some experts said that photography courses could be implemented perfectly for technical subjects, but they are less useful in conceptual matters.

After analyzing the gathered data, a seminar has been arranged in order to gather some experts in the field, students, and gallery managers. The seminar aimed to give more detailed information about the program, and the general idea of E-learning system. Moreover, all possible disadvantages have been overviewed again followed by a discussion among experts. Holding this seminar targeted possible cooperation. Several people were interested in establishing a relationship with our system as a lecturer, gallery manager or advisor after the seminar.

In order to sum up, as mentioned above, the disadvantages of face-to-face programs were analyzed. Overcoming some of those disadvantages may be profitable for E-learning programs. The systems should be designed in a way that much of the negative features of face-to-face systems should be removed.

3.4 Implementation Challenges

E-learning this makes students capable to follow all the instruction anytime, anywhere, with either their mobile phones or PC demands several sorts of applications and software which should be connected to each other, each of application may have to be coded with a different programming language. Constitution of a robust, adaptive and reliable relationship among all those software and applications is also a huge issue.

It demands high ability in coding and designing systems with a professional group of experts. Creating specific course materials is also difficult. Students and potential clients are all worried about how an E-learning program can manage to teach practical topics, which constitute the significant part of art online programs. These matters can only be addressed using high-quality graphical instruments, which are

able to guide students how to utilize their camera and its features. Obviously, finding a way to create an abstract social forum demands high level of programming ability, Fortunately such forums can be found more or less with the desired features in many websites which means that the task is not impossible though somewhat difficult.

Various levels of digital photography courses are considered in this study such as beginner, intermediate, advanced. Courses focus only on digital photography. The E-learning of photography system developed consists of four different parts:

1. A learning store
2. The Learning Management System (LMS)
3. Assessment management
4. Social Network

The first part is a learning store that collects all theoretic topic issues of the scheme such as texts, images, and films. This is a web content management system that permits creating, publishing, and administering content through a web browser. The flexibility of the structure's design admits for an easy revising of the content. The administrator and the instructor of a content can decide which modular contents need to be included, and in which order. They will be accessed by different category of users such as students.

All the photography material and courses are developed in a learning management system (LMS) by PHP coding that can deal with learning charts, content and distribution, students, tests, lecture scenarios and interaction with instructor. Each digital photography course contents have its own learning structure and different

scenarios based on the targets of the arrangement and the user's profile. The content of each course is acquired from the content management system. The system developments are created in an interactive setting and offer evaluation of the users by several assignments or projects.

Another part of the system is assessment management. The gathering of all the substantial built, indexed by the students and corrected by the instructor handle are elements of this part and for the development of knowledge techniques applied to a photography subject. It represents also a collection of various grades from known sources obtained under several environments.

The last part is the social network part, consisting of Gallery, Forum and Camera Information, including comments and popular vote and other similar features. Each user can connect and use the social network part. Details and more information of this part of the system for instance posts approval are explained in the simulation chapter.

3.4.1 Challenges Faced in Designing the Photography Teaching System

Planning students to different levels of course such as beginner, intermediate, advanced is a complex task. Constructing a proficiency test for this part is a complex task. Obviously, a proficiency test for photography course that is explained in the simulation chapter must be includes both a project part such as sending a photo to the course instructor beside some theoretical test. The next challenging issue is the feedback and assessment part and then to provide a reliable connection between students and the teacher. After the students finish the course work, the question is how we can assign grades and deciding for passing the course. We create some assignments during the course to develop the student's skill. The next question is

how can we from a “special content” for digital photography learning which means how the developer providing a components for the digital photography learning. The course must include components such as video, flash, and documents.

The evaluation policies are based on three parts, which are Projects, Assignments and Activities. 50% of the score is assigned to the final project, and the other 50% is dedicated to assignments. Assignments are separated into Quiz’s and Homework’s. For instance, uploading a photo to a gallery in one of the assignments or answering the theoretical part on the quiz. The activity aspect of the evaluation policies are meant to provide students with bonus marks according to how actively they participate in the forums, galleries and commenting on lectures. The instructors are responsible for tracking the policies and assigning marks for students. If students achieve above a 70% grade, they have the option to move up a level, or alternatively, graduate at that level.

Each course includes some sharable content objects (SCO). In the beginner level, one main course is included and each part of course has videos and documents. Some issues mentioned as possible weaknesses of E-learning programs can be summarized as:

a. Low level for student-student interaction which itself causes low efficiency in learning.
b. Low efficiency in teaching some technical subjects in its general concept, not photography particularly.
c. Low chance of student-expert interaction,
d. Low speed of Internet connection, for instance in Iran.

Photography learning needs practice after theoretical learning. Another significant subject in the learning part is imaginary learning. The imaginary exercise is based on photography creativity. The main problem is uniform educational practice to achieve creativity for all of the students, who lack special exercises and homework. Actually, teaching techniques and key points mentioned by the teacher is a competition between the traditional teaching and modern teaching approaches. It is important to set the effective connection and operational interaction between the students and the teacher. In many classical systems, the teacher plays the role of a spokesperson. In art teaching, teacher and peers sometimes play the same role because art is based on criticism and creativity. One-way communications in art class is a wrong way of teaching and is not compatible with photography learning.

3.5 System Analysis

The structure of the organization according to which the E-learning photography program will be implemented is based on Viable System Model (VSM) firstly presented by Staford Beer [9].

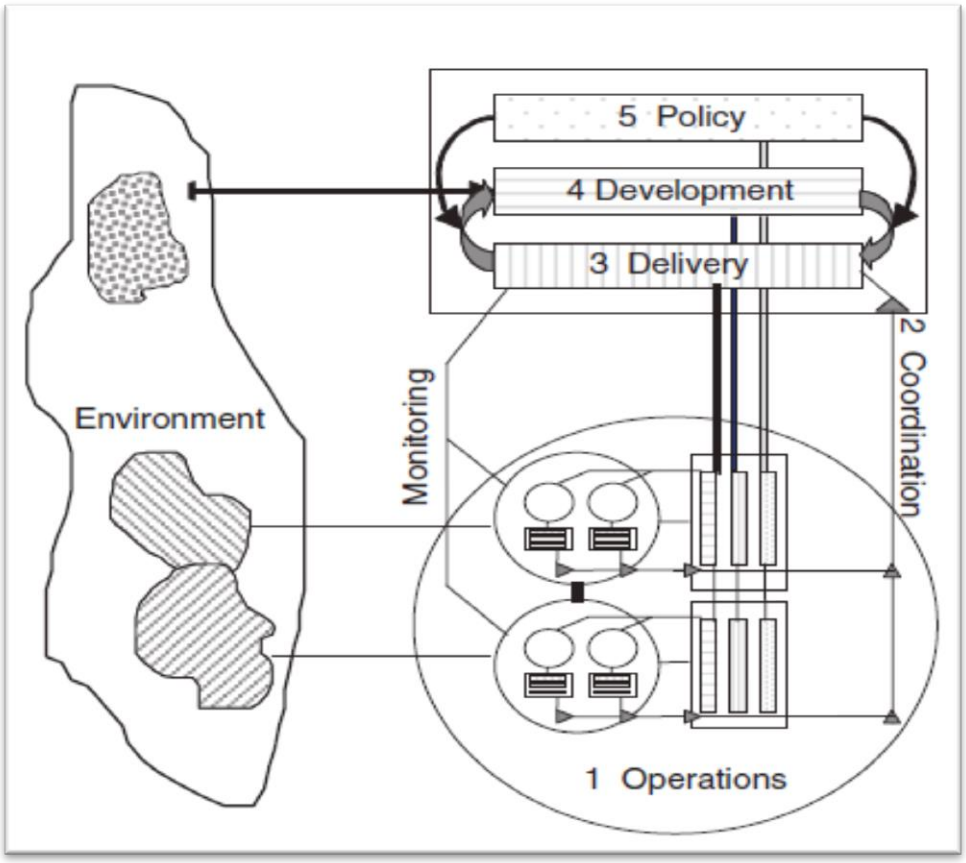


Figure 3.2: Viable System Model [9].

The model is the result of many years of efforts in order to understand how an organization can survive in a complex environment, adapt itself to the changes of environment, or change the environment according to its purposes. VSM, as Beer indicated, is a model, which all the viable systems from biological instances to large international organizations follow. The model consists of 5 different subsystems each of which has particular descriptions [9]:

System 1 – the set of activities that the organization does which provide value to its external environment, the primary operations (System 1 is drawn in the standard diagram below as a set of circles).

System 2 – the set of activities or protocols to coordinate operations that are needed to stop the different operations causing problems for one another (represented by the triangles on the right hand side of the diagram).

System 3 – the management activities to do with allocating resources to operations and ensuring they deliver the performance the organization needs, which we might call ‘managing delivery’.

System 4 – the management activities that has to do with understanding the environment and the future, with planning and change, the outcome of which is to develop the organization.

System 5 – the set of management activities that has to do with ensuring that the organization works as a system, specifically that there is a balance in decision making between Systems 3 and 4, and also maintains the organization’s identity and ensures that activities undertaken are consistent with acceptable practice, what we would normally call governance.

The subsystems should be found in any surviving organization while it does not mean that each subsystem should consist of many staff. In fact, a person or a section can be responsible of many tasks depending on the size of organization and its goals. One of the fundamental ideas of the VSM as system model is the Ashby’s Law demonstrating that only variety absorbs variety. Furthermore, taking a look at the definition of complexity is pretty useful in this work. Complexity, according to Beer, is the number of possible states, and accordingly, if the environment of a system is

complex (has lots of possible states), the system also can meet all of the states in order to thrive.

3.5.1 Complexity Equation

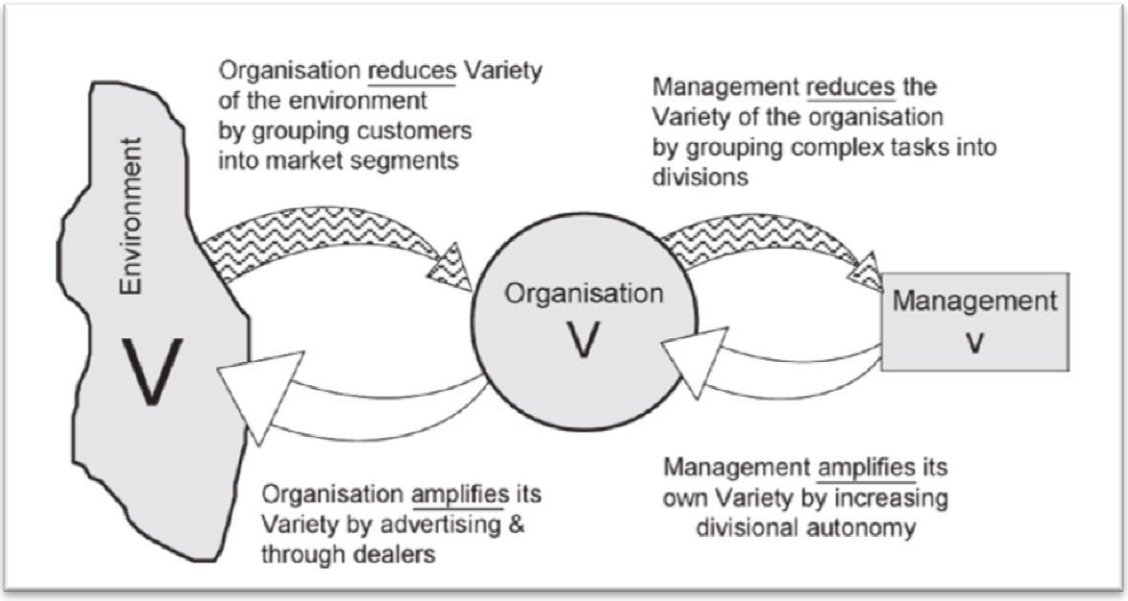


Figure 3.3: Complexity Equation [9].

According to VSM, the complexity of environment is always much higher than the complexity of the organization, and the complexity of organization itself is much higher than the complexity of management. The way those sorts of complexity can be handled is the reduction of complexity from environment to the organization and from the organization to the management in the way that possible states should be grouped into market segments and tasks divisions. In parallel, the variety of management and organization should be amplified by increasing the autonomy of divisions and advertising through the dealers.

In the E-learning photography program, the subsystems should be defined as follows:

System1: Responsible for generating materials for the environment, including courses, and topics.

System2: Responsible for regulating the materials according to the demands of customers: which sort of materials is suitable for a registered user: part of course, a whole course, several individual courses, or a whole program.

System3: Responsible for allocating required materials for system 1 including lecturers, programmers, critiques, devices, facilities etc. It also controls the quality of material representations by being connected to students and its own critiques while asking their satisfaction and checking whether the presented topics suffices student [Figure 3-6].

System4: Responsible for detecting the current and future advances in photography as either a technology or art. It is also responsible for new developments in multimedia technology, new topics in art education, and the future of E-learning education compared to face-to-face programs. System 4 watches the counterparts of the system and their activities, planning and achievements, possible improvements for the system, future art learning programs, and etc.

System 5: Responsible for making the relationship between system 3 and 4 based on current funds, students demands, financial situation, and systems policy.

What is unique in system analyzing of E-learning programs is amplifying the variety of organization which is not only maintained by advertising and through dealers but

also by applying new sort of technology and multimedia systems which are capable to make the resolution of customer grouping finer.

3.5.2 The Problem of Coordination

Whenever we have a set of primary operational activities operating with any degree of autonomy, there is the possibility that one operation that will do something will disrupt the activities of another. The function of System 2 is to reduce or prevent inter-operation disruption.

The valued-operation in our system is content production, which should be in 3 different frames (part of a course, course, and program). Should the system 1 concentrate on material production, and then the sub-operations are as follows:

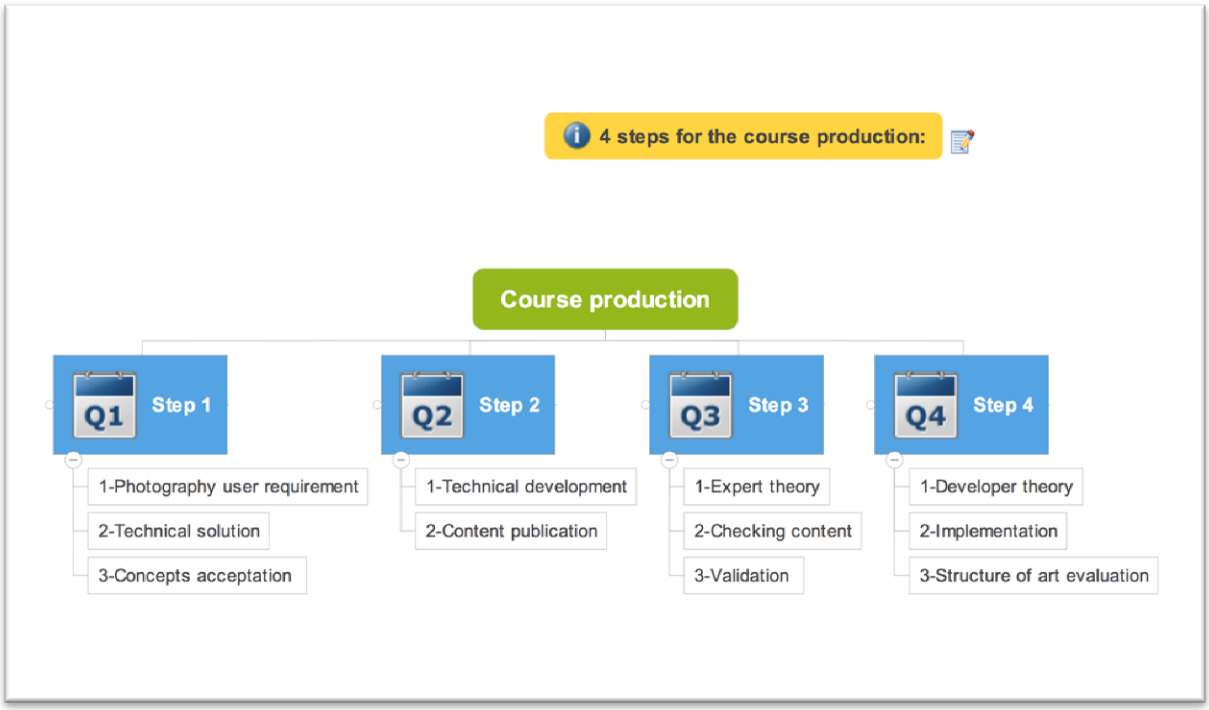


Figure 3.4: Course Production Process.

As cell-productionism suggests, all sub-operations that leads to a final product must be engaged in a cell. It indicates that each course must have its own programmer

handling all sorts of IT-related tasks. The reason is programming is the busiest part of E-learning material production.

It should be taken into consideration that above procedure is based on the complexity unfolding process according to the environment demands. According to complexity unfolding process, the only complexity that must be taken seriously based on which giving autonomy to the other parts is possible, is that of the mind characteristic (visual-textual).

In order to establish a coherent system of production, the priority of material generation is vital, as in fact; each topic is produced once, and thereafter should be very often updated according to feedbacks. The topics which relate to the core of photography program and are most popular must be created first. After creation, the topic should have its own team of production including programmer, experts, and etc.

The autonomy given to each group to overcome the complexity is related to the demands related to each topic (more online discussions, more face-to-face practices, better technical solutions, more detailed explanations), which indeed can be achieved using cell-production policy.

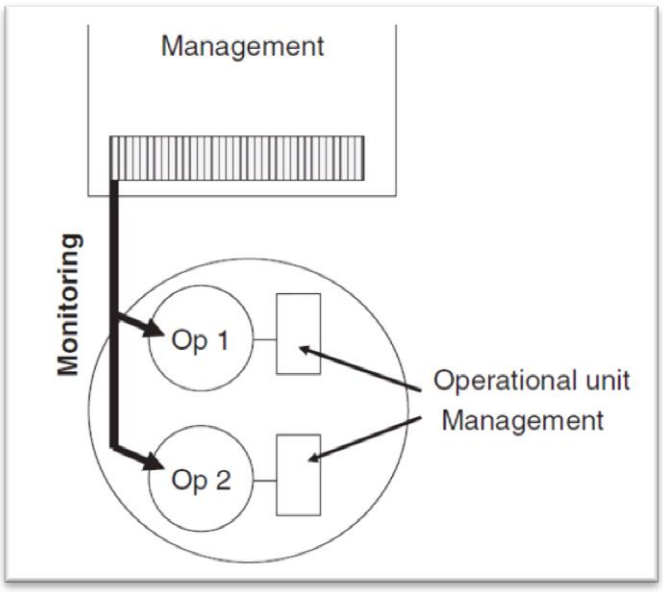


Figure 3.5: Monitoring channel [9].

Monitoring channel supplements performance reporting with sporadic in depth check of operations at next level down. By passing on level of managements [9].

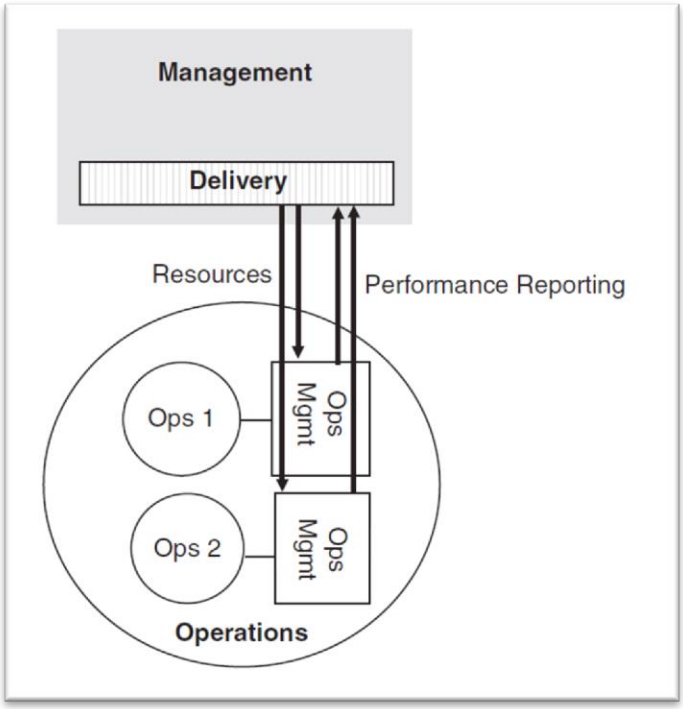


Figure 3.6: System 3 delivery–managing [9].

System 3 delivery–managing delivery and synergy. Bargaining resources for performance [9].

3.5.3 System 3: Allocation and Monitoring

An agreement should be established between Systems 3 and 1 in terms of the budget and the measure of outcomes. All the courses need to be updated within time, but no one can oversee what sort of update a course needs (technical, content, multimedia), [Figure 3.6 and Figure 3.7].

The monitoring is the way the performance of operation cells is measured. In IT technology, it will be easier to have correct statistics as technological instruments led us to check the ongoing procedure of material production. There are several evaluation factors on previous work in Tehran Technical Institute some of which relates to central management while others accord to operational management:

Central Management:

1. The additional number of students registered in the next program compared to the last held program without changing the state variables.

2. The distribution of registered students among the states of the country.

3. The distribution of registered students among the foreign countries.

4. The distribution of registered students from large cities or the cities where traditional photography programs are held with acceptable quality.

5. The distribution of registered students according to economic power of the city they accommodate.

Operational Management:

6. The students' comments.

7. The assessment of their final works.

8. The assessment of their final work compared to the other students registered in the rival programs.

3.6 Data Gathering

This section will be used to address the comparison of E-learning and traditional photography programs and the effect they may have on artists' and technicians' long way in art.

In order to investigate the characteristics of face-to-face classes, an extensive survey has been arranged among several groups of students in private and public institutes in Iran. The questions of the survey are as follows:

1. In your opinion, what are the limitations of face-to-face photography courses?

2. What are the minimums facilities required to hold a photography education? What equipment you should purchase but you cannot afford?

3. What are major problems of the photography courses' alumni? What they should have known but did not learn in the program?

4. What are the limitations in the sub-majors (Journalistic, landscape, sport, theatre…) of the photography programs holding in your country? What are the reasons for these limitations?

5. Does your education system have a responsibility in forming the relation between the market and students? If yes, in what way?

6. Do you see any problem in evaluating students in their courses in face-to-face photography programs?

7. Which potential or actual problems do you see in E-learning photography programs?

8. Which of the sub-majors of a photography program cannot be implemented in E-learning program? Why?

9. Do you know any photography courses in the world, which fits your taste the most?

10. In your point of view, what are the inter-disciplinary courses, which are important for photography courses, but you do not have in your education?

11. Do you have any plan to implement as a general photography improve, which can satisfy any demand from any potential student?

12. Do you know any source to collect further information about the above questions?

The results of the survey show a sequence of problems, students usually encounter, in face-to-face classes, unfortunately they believe that the E-learning system is unreliable.

Students are not satisfied with time spent by lecturer and these results in lack of motivation for most students to continue in the photography class. Many of them have expressed that the duration of time in each course for covering all the materials is not really enough. By the end of each course, they really feel that there are still many unmentioned, uncovered topics, or there exists topics that they have not thought appropriately.

The second major problem, mentioned by several students, is the quality of lecturers, which is independent from the course's duration. Although the lecture material used by the lecturer in a specific course is unique, the quality of teaching is a function of lecturer's mood, his living quality or any other not-art-related factor. They complained that not all the professors really care about their improvement in their work. However, students are always seeking someone who cares about their improvement and progress and follow their evolution in art and attitude, which demands a notable consideration from the lecturers and staff members.

Thirdly, as it seems to be a global problem, nearly all the surveyors have mentioned the price of equipments and facilities. In fact, purchasing a camera, as the most basic tool for photography, which possess the least demanded characteristic for an

academic program is not possible for all the students. Although starting any major of fine arts costs a lot, these costs in any sort of photography increase highly as it has much more relationships with technology. When students choose their proficiency in photography (natural, social, sport, theatrical, etc) they again will have to complete their facilities and purchase more required stuff.

Beside the mentioned challenges in face-to-face classes gathered from students and also experts, we should also write about the alumni's issues. Finding financial resources, mentors, investors, and support of galleries for their artwork in addition to searching for jobs in related markets is really a difficult subject. What students accordingly wish is a reliable and stable contact with the relative market established by the institute or university they are studying in. In fact, they see themselves alone after graduating from their studies apart from the lack of knowledge and experience they would feel after finishing school. They also believe that lecturers and academic artists can also play an important role in making links among their talented students and the market. However, their assessment from the connection between their institutes and market, galleries and mentors is generally weak and not organized.

The other major issue for students is their transportation costs. City journeys costs notably high nowadays in any country. Moreover, for out-of-cities and abroad students you should also add the living costs, which is of course true for any other academic major.

Above all, more importantly, we should mention the cultural issues. Several surveyors express lack of a proper cultural atmosphere for their profession on photography. The sub majors like social, fashion and even natural photography

demanded the photographer to be involved in tension places, politically insecure or banned atmosphere, naturally dangerous scenes, religiously inappropriate looks and etc. In Iran and other politically limited countries there are protecting rules for photographers to present themselves in demonstrations, military bases, socially damaged areas and any challenging event the photos of which may have undesired effects on public attitude.

Modeling shoots must also be added as there are no legal markets for it in religious countries, and even if there is a market, it seems unusual. These restrictions have made students ignore those majors following of which may put them in danger in their future work.

Furthermore, limitation in fashion photography in religious countries has forced universities to eliminate such a major out from their photography programs which itself has caused the country to meet lack of experts. In addition, in some countries, it is also banned to teach or show materials, which are, opposed to the government's policy, in general courses, which their content seems not to be problematic. The mentioned issues have influenced on student's attitudes to the face-to-face photography programs as they all think that not all the materials are worth to follow even if their quality is high since they may be in trouble in their future work.

The surveyors have complained less about their lecturer's assessments. Just a few students thought that their final works in the courses are not assessed fairly. However, many of them still believed that the process should be improved, and some other factors should also be added to the judgment of lecturer. The E-learning System for Digital Photography is fair in its grading system due to enabling not one

instructor to assign the grades for students, but to have many instructors evaluating and grading students' grades. With such a system, the averages of all instructors are taken and this is how the final grade is achieved. Besides the grading system, there are activities, gallery and forum to help instructors to assign more fairly.

The other side of the coin is the advantages of face-to-face programs. Many experts believe that face-to-face programs can provide an atmosphere for students to negotiate, share their experience, and exchange their ideas and beliefs. They also mentioned in the conference held by our group that more than the materials students usually learn in academic programs, there are topics and points they are supposed to learn from each other, from the society they are living in, from their social interactions and so on. Students must travel, experience what they have never seen, face new thoughts and ideas and let their beliefs be tested by interacting with opposed thoughts. In fact, not all the materials should be learned in a classroom and from a teacher. They are specifically insisting on theoretical and abstract courses where there is not a clear border in the course i.e. There are a huge amount of literature with variant point of views such as history of art, philosophy of art, aesthetics and etc. In their point of view, if for a mature student, the number of learned topics is 1000, just 11 or 12 of them have been learned in academic programs, and the student itself during his social activities has shaped the rest. Briefly speaking, they see a face-to-face program not only a place for teaching and learning a classroom, but also a cultural social atmosphere for students to interact and evolve new ideas. Therefore, the more a university is big with lots of students originated from different areas, the quality of social atmosphere they would be involved, and consequently, the more they will learn.

As mentioned above, the survey shows some sort of unreliability related to E-learning programs. Although it can be judged that the general knowledge about E-learning materials is not enough among the surveyed, this was indicated by many unanswered (or not well answered) questions about E-learning programs in the survey.

Another general issue, which they have mentioned, is the quality of Internet in their country. As the speed and stability of connection is quite poor in their country, no one relies on the any sort of education based on Internet.

The surveyed have also casted doubt about the quality of E-learning courses, which are concerned with technical materials. They mostly asked how one could create an online material about image's composition or lighting, which of course depend mostly on the quality of camera itself. In fact, they more or less think that E-learning programs at least in art are in their second priority.

One can group the issues into the art related and not-art related problems. However, vital categorization is to group the problems into face-to-face related and E-learning related problems i.e. those issues that can exists in both sorts of programs. Economically, the first group is the one, which makes the E-learning program profitable while the second group includes problems, which should be tackled so that the E-learning program can be promising.

As the current result by several years of experiences in the program ran at TIT starting in 2009, producing photography E-learning materials, here we present some results indicating a semi-successful program. Basically, our ongoing research is

based on the following results, which were obtained after several years of running the photography E-learning program. The results were gathered within 2010 to 2012. Results in Table 3.1 includes some parameters considered.

Table 3.1: Survey Results of Tehran Technical Institute

Topic	2012	2011	2010
Registered Men	59	37	40
Registered Women	41	63	60
Employee	73	75	54
Self-Employed Students	30	39	19
Engineers	70	49	54
Non-Tehran Iranian Students	63	54	15
Tehran Students	30	40	85
International Students	7	6	0
Alumni who think that the program was inefficient	18	33	20
Alumni who just needed the diploma (Neutralized about the quality of content)	58	72	75
Alumni Who complained about the quality of MLS	83	78	94
Alumni who complained about the quality of internet	94	80	97

3.7 The Online Photography E-learning System

The scheme of the photography E-learning system is based on seven main parts, which are: Registration, Courses, Upload, Gallery, Camera information, Test your Level, Forum. Each part is divided into more detailed sub-parts according to the new vision of E- learning system.

Figure 3.7: Main page of E-learning system design

Figure 3.9, shows the different parts and the general structure of the system. More specific parts of the system are discussed in the Learning Management System and Simulation Chapters.

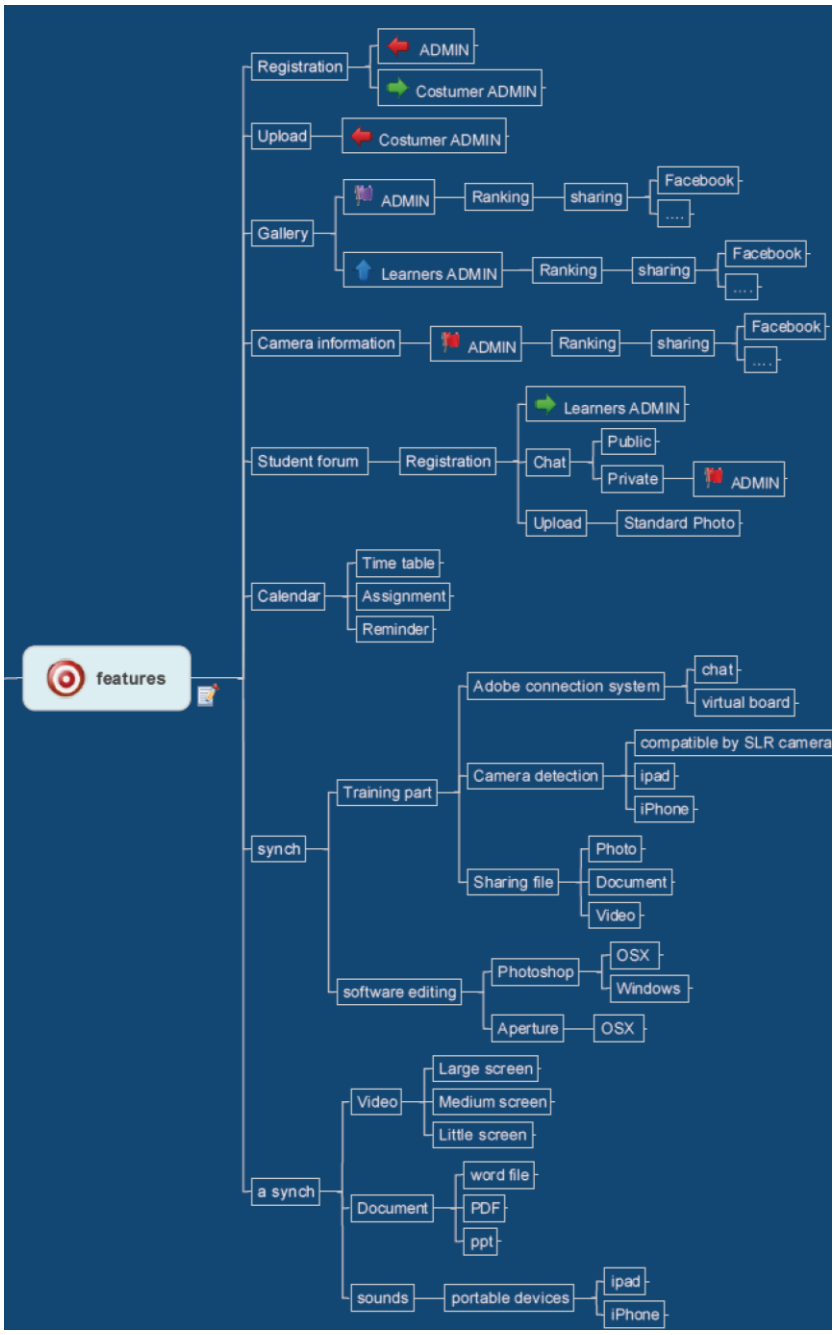


Figure 3.8: General structure of the E-learning photography system

3.7.1 Digital Photography Courses Developed

Digital photography is a pioneering learning environment. In our E-learning photography system, with contributions from experts, there are three different levels of courses:

- Beginner Photography course
- Intermediate Photography course
- Advanced Photography course

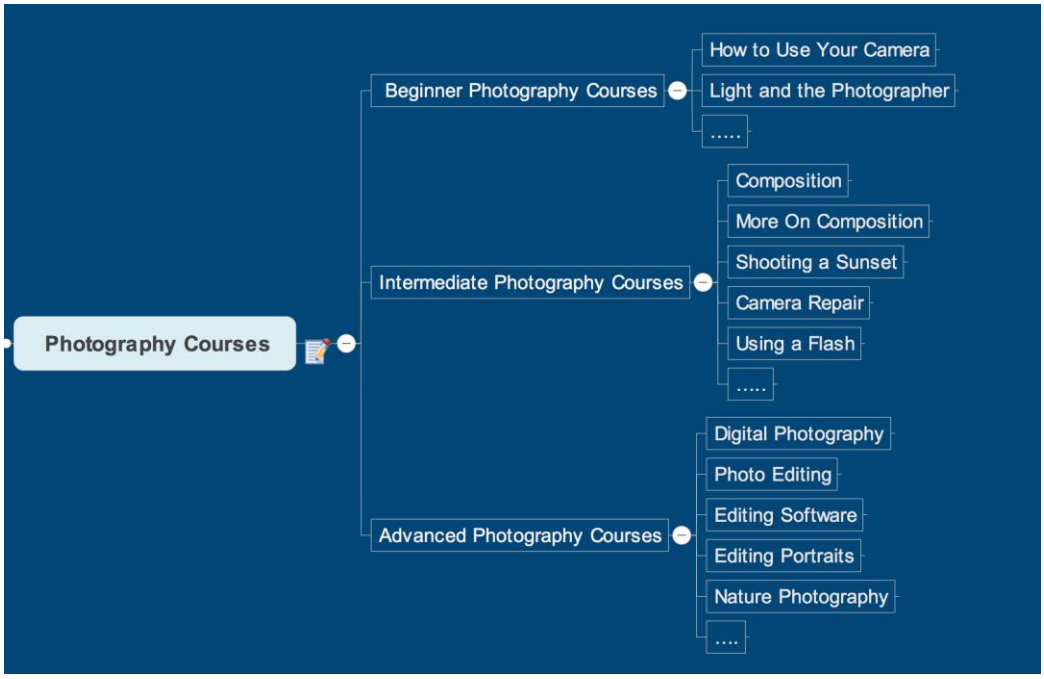


Figure 3.9: Levels of digital photography courses

For students or other users there is also a download feature.

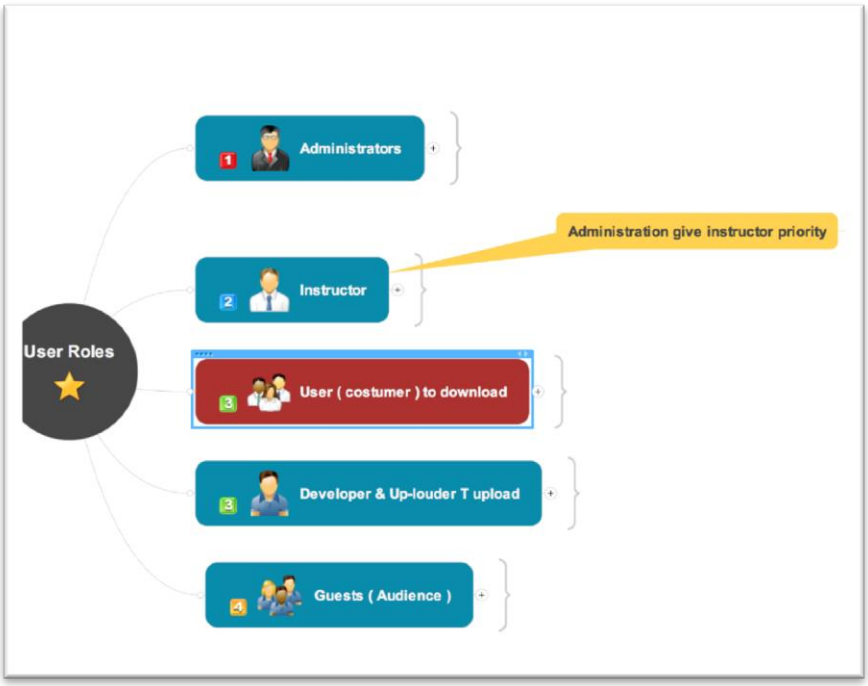


Figure 3.10: User role for download part

Students register to our system as a customer or user [Figure 3.11] and connect to the download part of the system. Students access the digital photography courses after their proficiency is submitted to the instructor [Figure 3.12] The proficiency test(Test your level) for students includes two parts:

1. Answer Several theoretical questions.

   [Theoretical level]

2. A project including five photos in different categories.

   [Abstract _ experiences level]

After analysis of student's proficiency by the instructor he/she assign level: beginner, intermediate or advanced.

3.7.2 Beginner Photography Course

The course covers both the creative and technical sides of digital photography through an offline-lesson course. The students you will look at the history of digital photography get various information about digital cameras and basics camera works and lighting.

This part is presented in offline-lesson because it is mostly to handle the theoretical issue of digital photography learning. The beginner's level course encourages students or user to dive in and understand the fundamentals of digital photography through taking pictures such as: home, cars, trees, pets, objects in movement and shadowing techniques, and so on.

3.7.3 Intermediate Photography Course

The Intermediate level covers some basic photography instructions and techniques for framing, how to take good pictures, portrait or personal photos, professional poses and digital photography. This part is present in both offline-lessons and online-lessons. Online part is for the student's assignments to improve the experience of the student. It is important if the user is considering to improve his/her knowledge of digital photography.

3.7.4 Advanced Photography Course

Advanced level is a higher-level and professionals are also encouraged to take these courses. It covers digital photography topic such as arial, portraits, sports, nature, and any advertising production, fashion and photo editing. This part is present in both offline-lessons and online-lessons. Students in this part achieve advanced and practical knowledge working with Single Lens Reflex (SLR) and Digital Single Lens Reflex (DSLR) cameras.

Moreover, the advanced course encourages users to understand the necessities of professional digital photography by teaching studio lighting, how to shoot professional portraits, wedding photography, some instruments for editing such as using light room software and using Adobe Photoshop software. Besides those, it is containing issues about High Dynamic Range (HDR) photography and macro photography practices.

3.7.5 Comparison of our System with the TIT System

Educational research on the previous analysis from Tehran Technical Institute helps to handle numerous issues such as the following;

3.7.6 Communication between Users

- The system has a chat scheme, forum, gallery; camera information pages, an internal message system and the user categories can make use of it such as administrator, instructor, students.

- A ranking system for gallery with votes of different values.The vote value of instructor is higher than students or guests. This feature help users to show clearly his or her ability in the digital photography by comparing the vote on the system with an automation technique.

3.7.7 Access Level and Security

- -Access to the system such as using lecture notes, gallery or other parts of the system must be permitted only by registration the administrator has first level priority, an instructor has second level priority and as a download user or upload user has third level priority.

- Students or downloader's users have access to lecture notes for the courses are registered.

- An up-loader (Contributor) user has access to upload part of the system.

- Only the administrator, who has the highest priority on the system and instructor as second priority, can do management of courses. Instructors manage their courses and administrator manages the whole of system.

3.7.8 Activity and Tracking System

- Activity page is created to show the actions of users such as upload photo or any file in gallery or camera information page, and leaving a comment in the communications part of system.

- The instructor and the administrator can track the assignments and work progress of students using the automation part of the system.

- Notification system (as a part of the learning management system) is to notify important duties on the calendar such as assignments, new lectures or any new messages from the instructor.

3.8 Content Management System

Contents are accessed based on priority in the content management system. Tools used in this system are (open source) and more flexible and extendable, created by PHP scripts that store information and data into the MYSQL database.

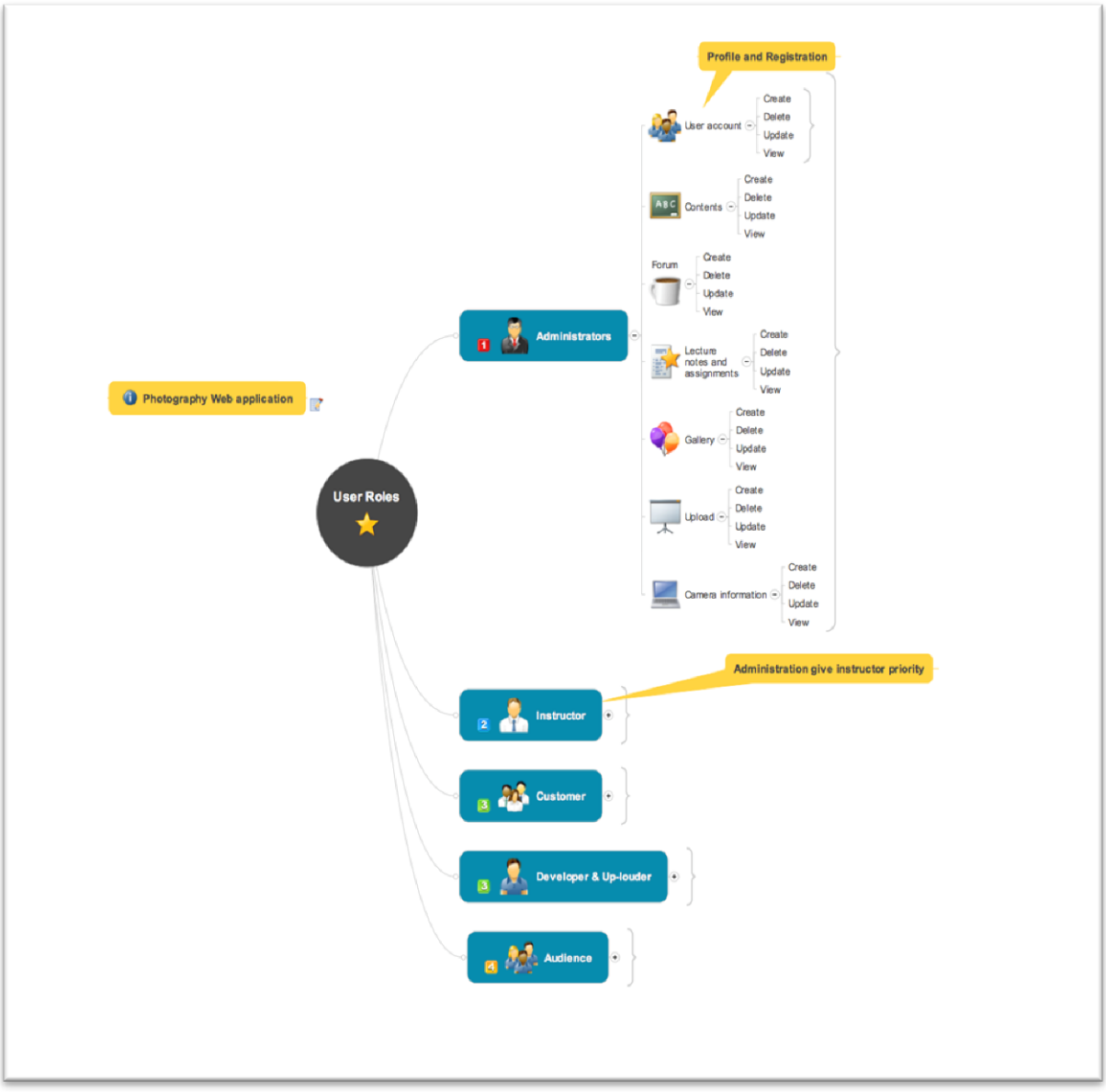


Figure 3.11: The roles of people in the system

3.8.1 Roles of People

The priorities of the system are composed of four categories from 1 up to 4 they are:

1-Administrators; they can:

- Create/Delete/Update/View user accounts
- Create/Delete/Update/View contents
- Create/Delete/Update/View lecture notes
- Create/Delete/Update/View assignments
- Create/Delete/Update/View forums
- Create/Delete/Update/View announcements
- Create/Delete/Update/View gallery
- Create/Delete/Update/View camera information
- Create/Delete/Update/View Upload:

2-Instructors; they can:

- Create/Delete/Update/View contents
- Create/Delete/Update/View lecture notes
- Create/Delete/Update/View assignments
- Create/Delete/Update/View forums
- Create/Delete/Update/View announcements
- Create/Delete/Update/View gallery
- Create/Delete/Update/View camera information
- Create/Delete/Update/View Upload:

3-Users (student/ user to download) can:

- View user accounts
- View contents
- View lecture notes
- Create/Delete/Update/View assignments
- Create/Delete/Update/View forums
- View announcements
- Create/Delete/Update/View gallery:

  Create /update/delete (must be request to instructor)
- Create/Delete/Update/View camera information

  Create /update/delete (must be request to instructor)
- View Upload:

3-Uploader users (contributor) can:

- View user accounts
- View contents
- View first chapter of lecture notes (Sample lecture)
- Create/Delete/Update/View forums
- Create/Delete/Update/View gallery:

  Create /update/delete (must be request to instructor)
- Create/Delete/Update/View camera information

  Create /update/delete (must be request to instructor)
- Create/Delete/Update/View Upload:

  Create /update/delete (must be request to instructor)

4- Guests can:

- View user accounts
- View contents
- View first chapter of lecture notes (Sample lecture)
- Create View forums
- Create View gallery
- View camera information
- View Uploads

Some important advantages of our learning management system are:

- Separation focuses on content, structure and design as dynamic web content.
- The administration part was developed so that administrators can easily manage and control the system.
- Advanced user management options.
- Support of multi user and multi course approach.
- Advanced feedback system.
- Easy user and student's practice tracking for users and students.

Details and more information of learning management of system are explained in the simulation chapter.

3.8.2 The Course Production System

Course production is one of the challenges in an E-learning system. The first step for course production in the photography field is the device requirements such as camera, lens, lights and other photography instruments.

The second step is creating the content production mechanism using technical developments on the system. In this part, the role of multimedia is effective, by using of different multimedia tools on a learning system [2]. The expert must validate the content and it must be accepted in step three. The content must be implemented by the developer on the system, and placed on the learning management system [LMS]. The last part in step four is checking the structure of evaluation. See [Figure 3-5].

3.8.3 The Course Outline

Based on the feedback from the experts, we created three different levels of photography courses. Beginner and Intermediate course outline are based on the curriculum of Tehran Technical Institute and the advanced outlines course is based on New York Institute of Photography (NYP) curriculum [26], which is one of the most popular photography institutes in art, and professional photography. It uses multi-media training tools developed by professional staff with high a level of expertise.

The Beginner course outline

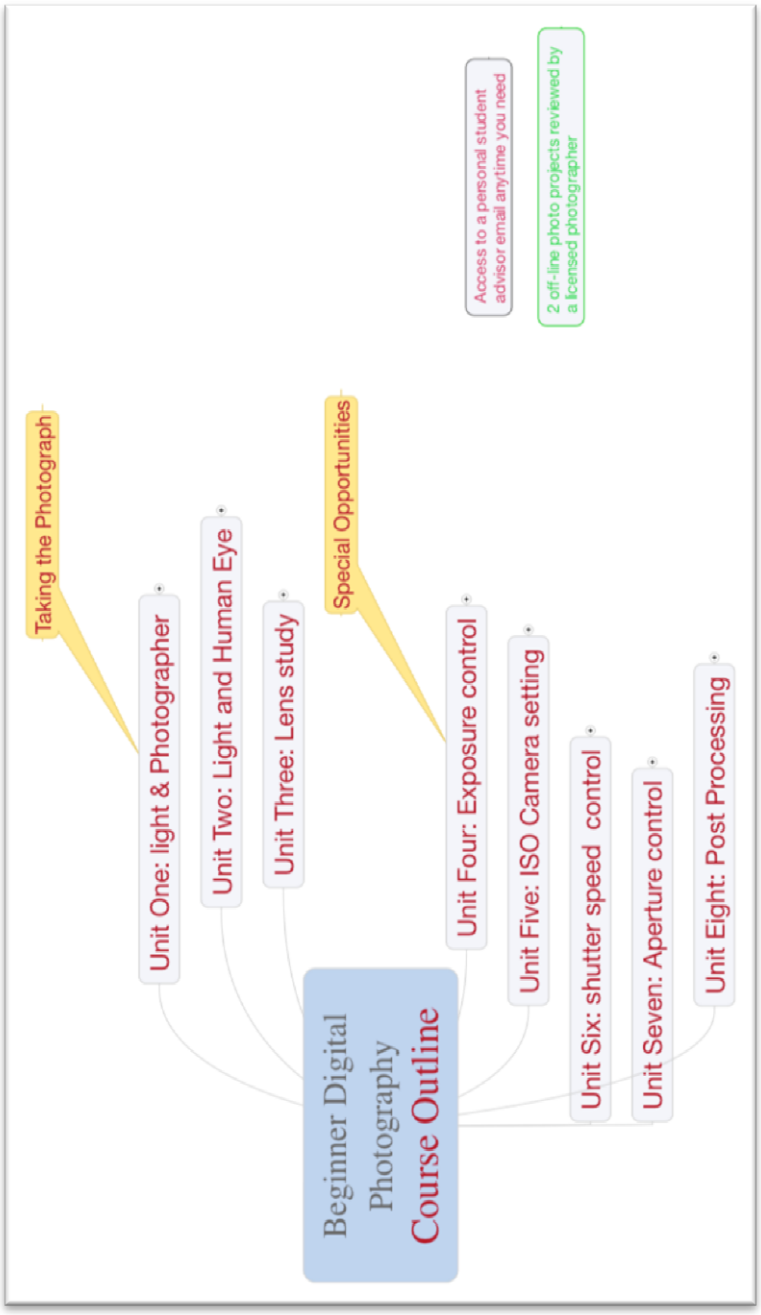


Figure 3.12: The Beginner course outline [26]

The Intermediate course outline

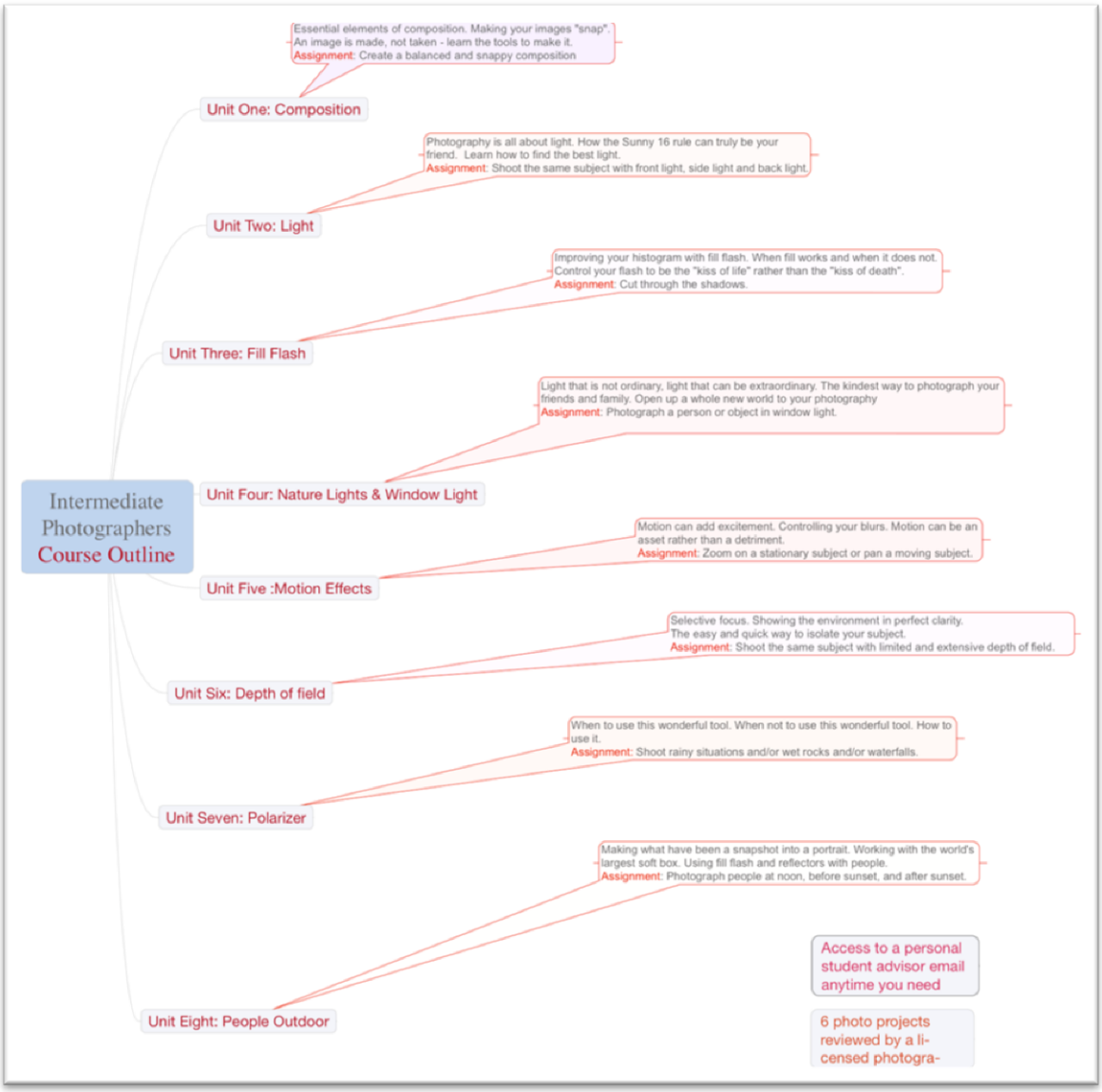


Figure 3.13: The Intermediate course outline [26]

The Advanced course outline

The advanced course outline is separated into four parts: Fundamentals of Digital Photography, Professional Photography Marketing for Photographers and Photoshop study.

The Fundamentals of digital photography outline course

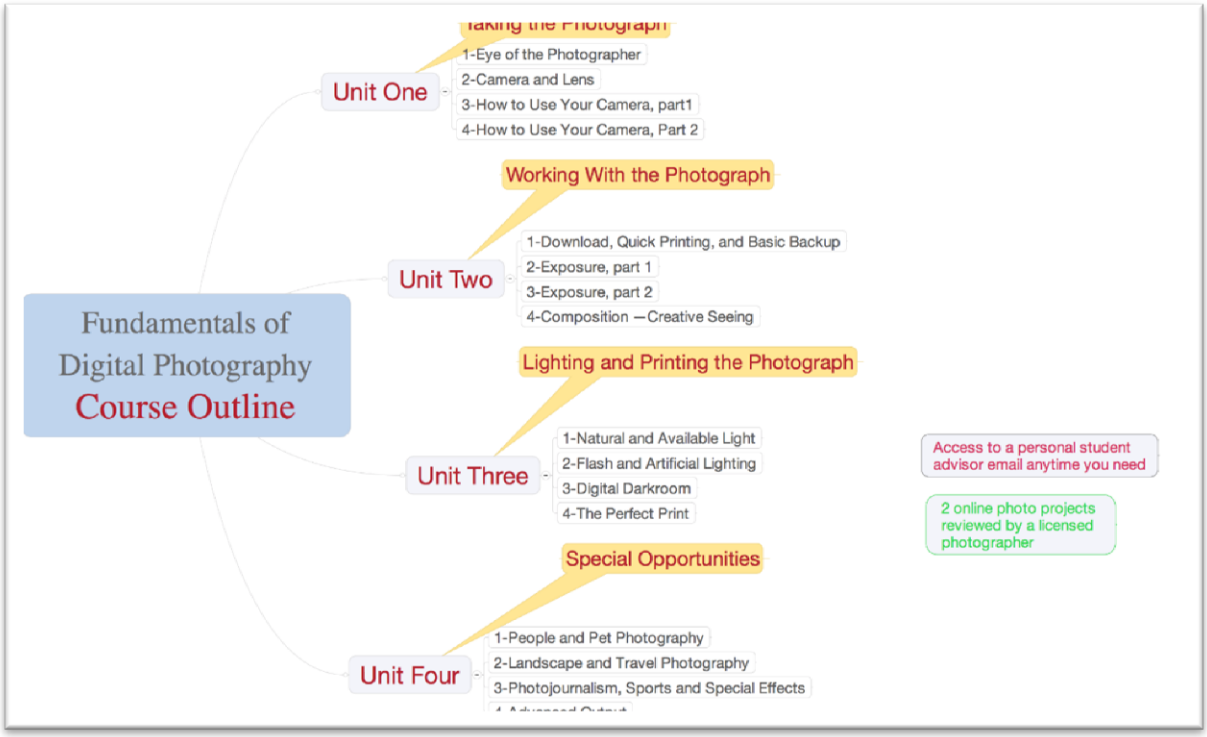


Figure 3.14: The Fundamentals of digital photography course outline [26]

The Advanced digital photography course outline

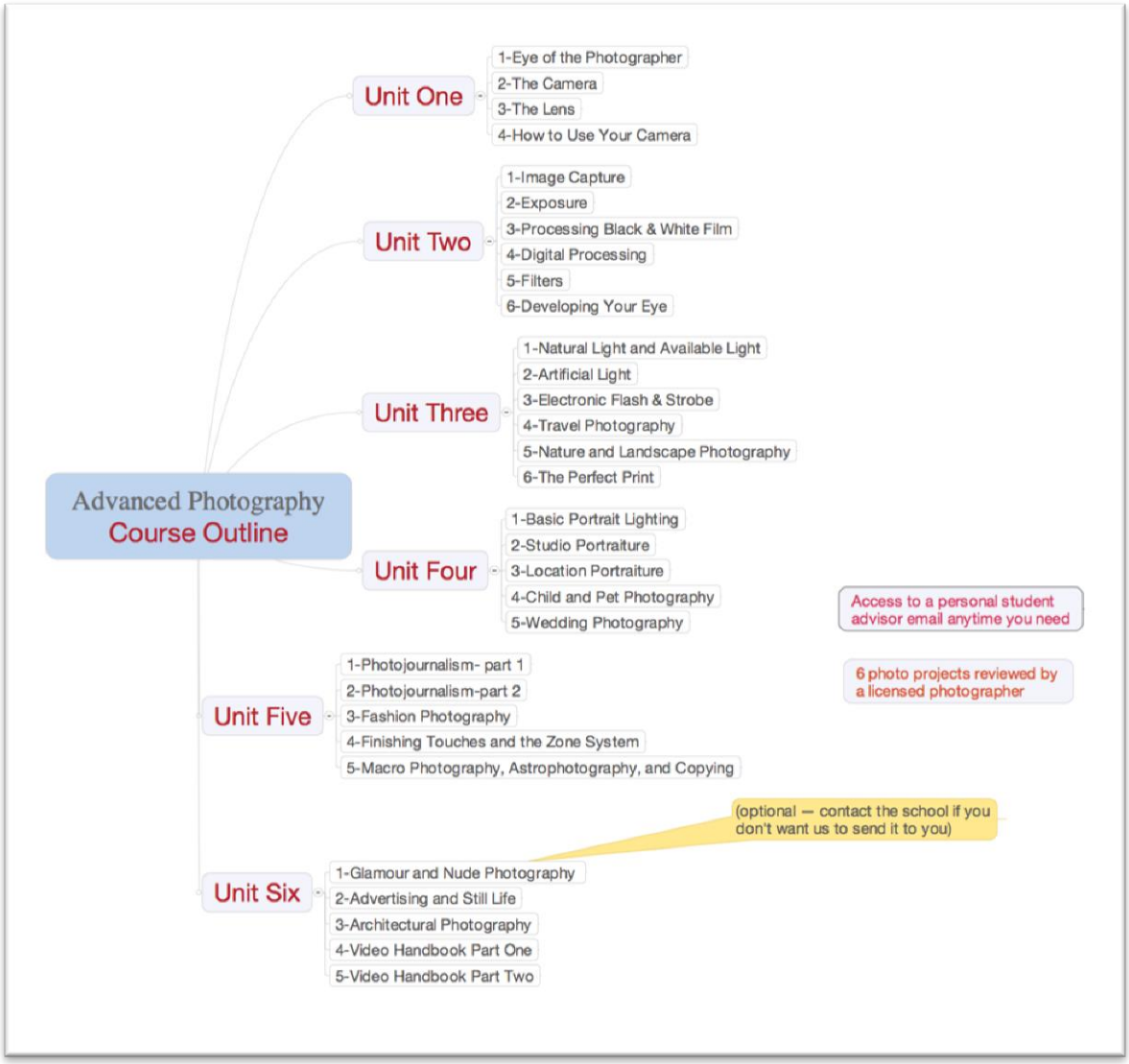


Figure 3.15: The Advanced digital photography course outline [26]

The Photography marketing course outline

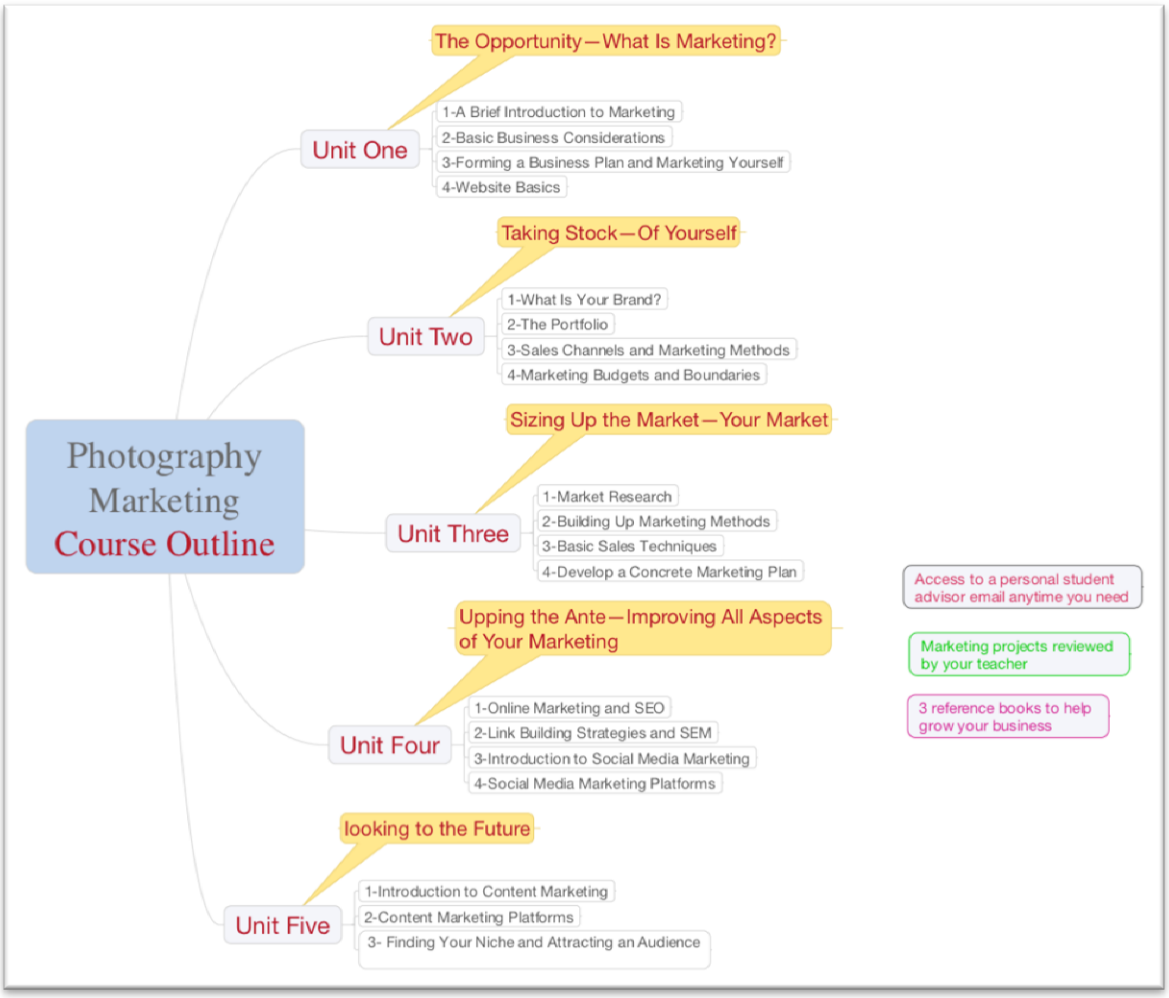


Figure 3.16: The Photography marketing course outline [26]

The Adobe Photoshop software course outline

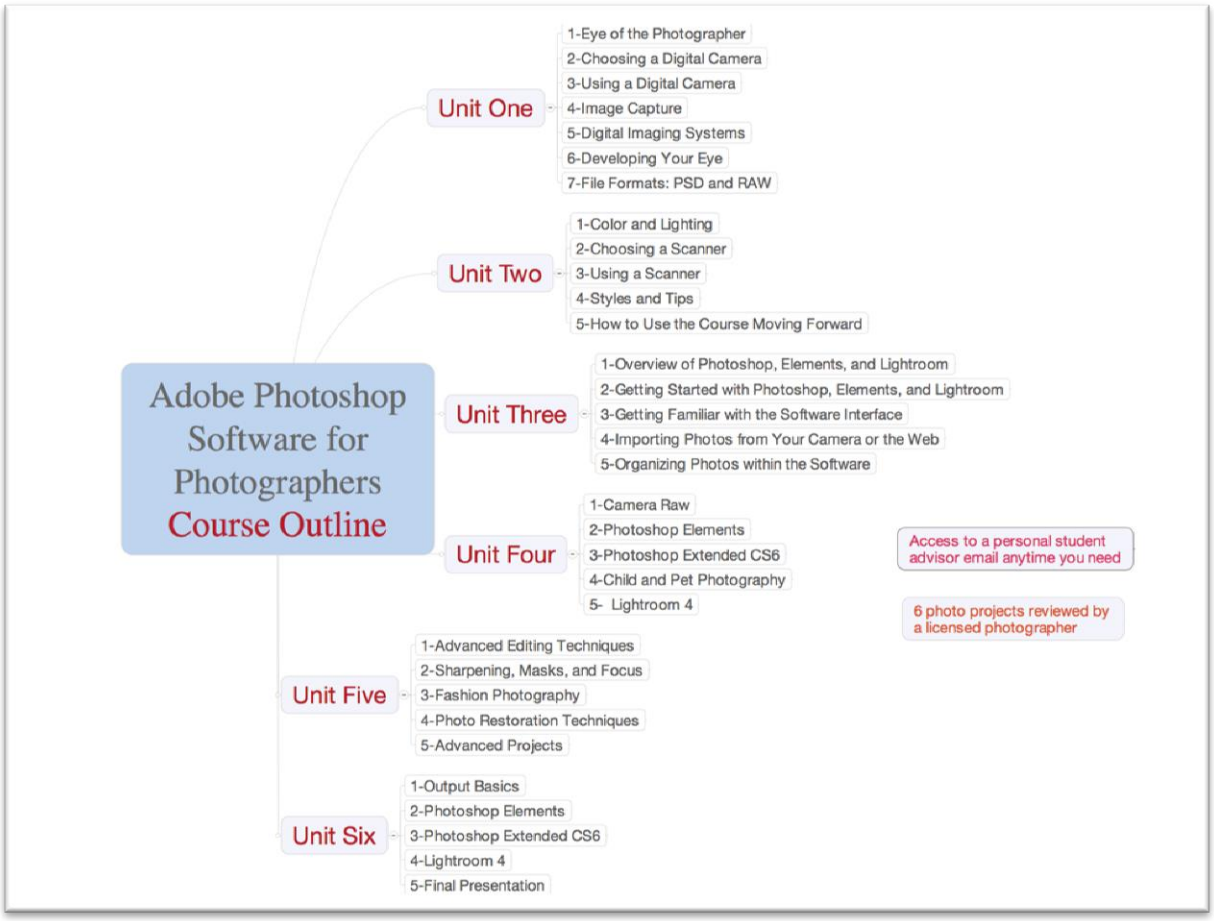


Figure 3.17: The Adobe Photoshop software course outline [26]

3.8.4 Main Properties of System Tools

Five tools were developed and used in our system based on field investigation and research. The main properties of system tools are separated into user tools, support tools, social network tools, activity tools and technical tools.

The system tools are divided into program tools, content tool, user tools, productivity tools, communication tool and support tool, which were explained in the previous section. Figure 3-20 shows the structure and relationships of these system tools. The main structure of the communication tools includes: a Chat system, Photo Gallery, Forum, Image Upload, Contributor posts, Camera information page and some extra features such as virtual white-board for the synchronous part (which is left as future work). In communication tools, upload is created for contributing user by uploading their files into the video services part. More specific information is discussed in the simulation part (Chapter 4).

Productivity tools include:

- Calendar (Timetable for setting new assignment or appointments on the system).
- Bibliography /Book mark (All lecture of book is upload in this part).

A user tool was created to manage the account of the all users on the system. This includes creating profiles, assigning user's votes and student's grades.

All the assignments authentication information is managing by the support tool. All activity related to the contents tools, activities such as, handle content: Test or results of assignments, user management, content sharing and content templates. The program tools handle general management of the contents, this includes: Content Outline, Schedule, Announcements and User Tracking.

3.8.5 Voting Online Photography Gallery (VOPG)

The aim of this system is to compare the students with each other. Students can upload their assignments as a photo on the gallery according to a schedule. The administrators and instructors handle the system controls. Voting can be done by peers or by instructors. Comments for photos may also be written. The instructors vote out of 5 stars, the student's vote out of 10 stars. The system just shows all the votes. So, in this system, many students and instructors can vote for a single photo, which enables a more even and fair assessment system.

The VOPG system has terms and conditions that will remind users that copyrighted photos are not allowed on the system. One policy in the system is that all photos that are uploaded must contain the user's signature within the photo itself.

3.9 The Architecture of the Photography E-learning System

The Architecture of the photography E-learning system contains to four sections:

- LMS (Learning Management System)
- CMS (Content Management System)
- DMS (Digital Management System)
- SMS (Social Management System)

(Figure 3.18) shows the architecture of the digital photography of E-Learning system. More detail about developing the model architecture is given in (Figure 3.29).

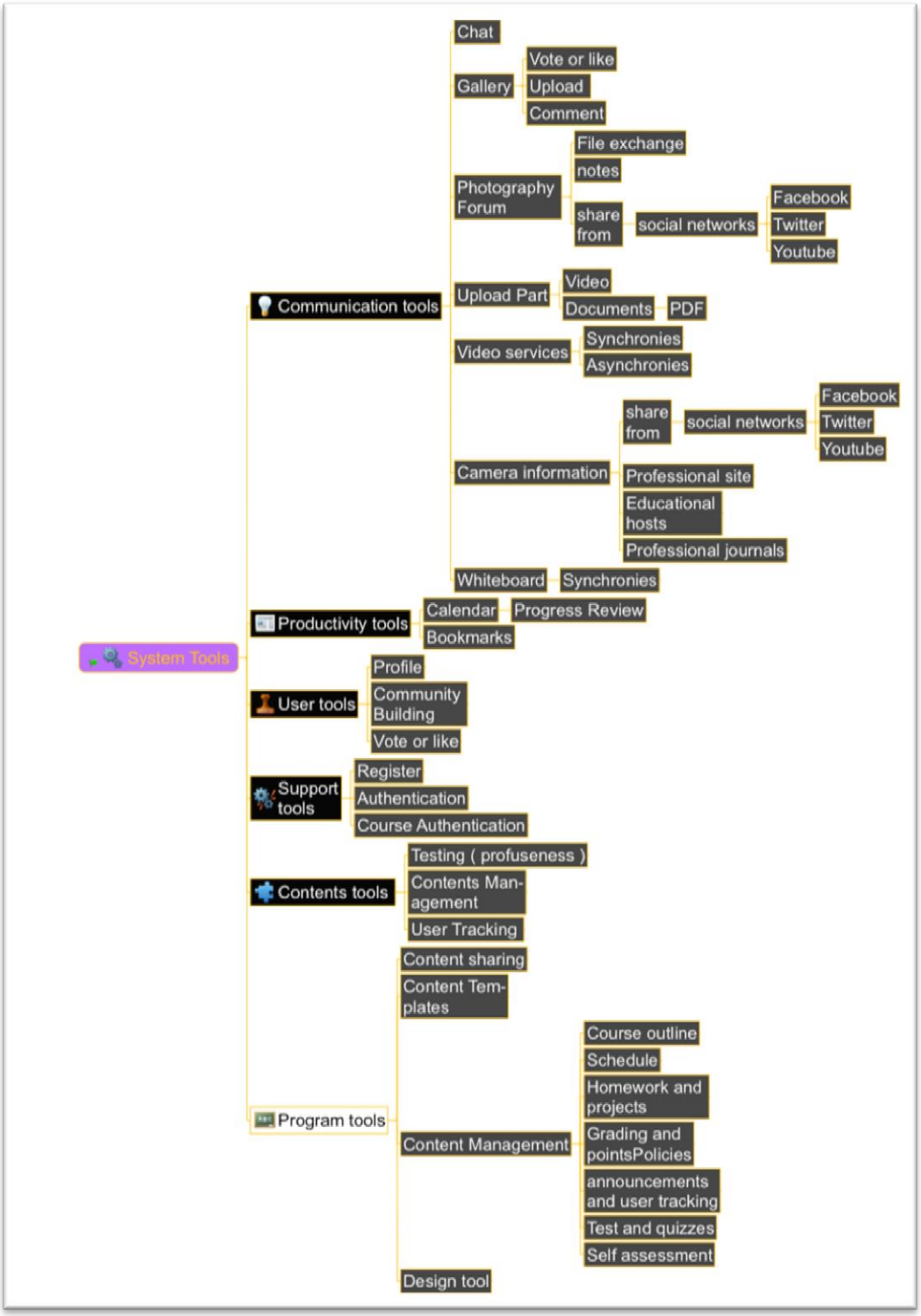


Figure 3.18: System tools

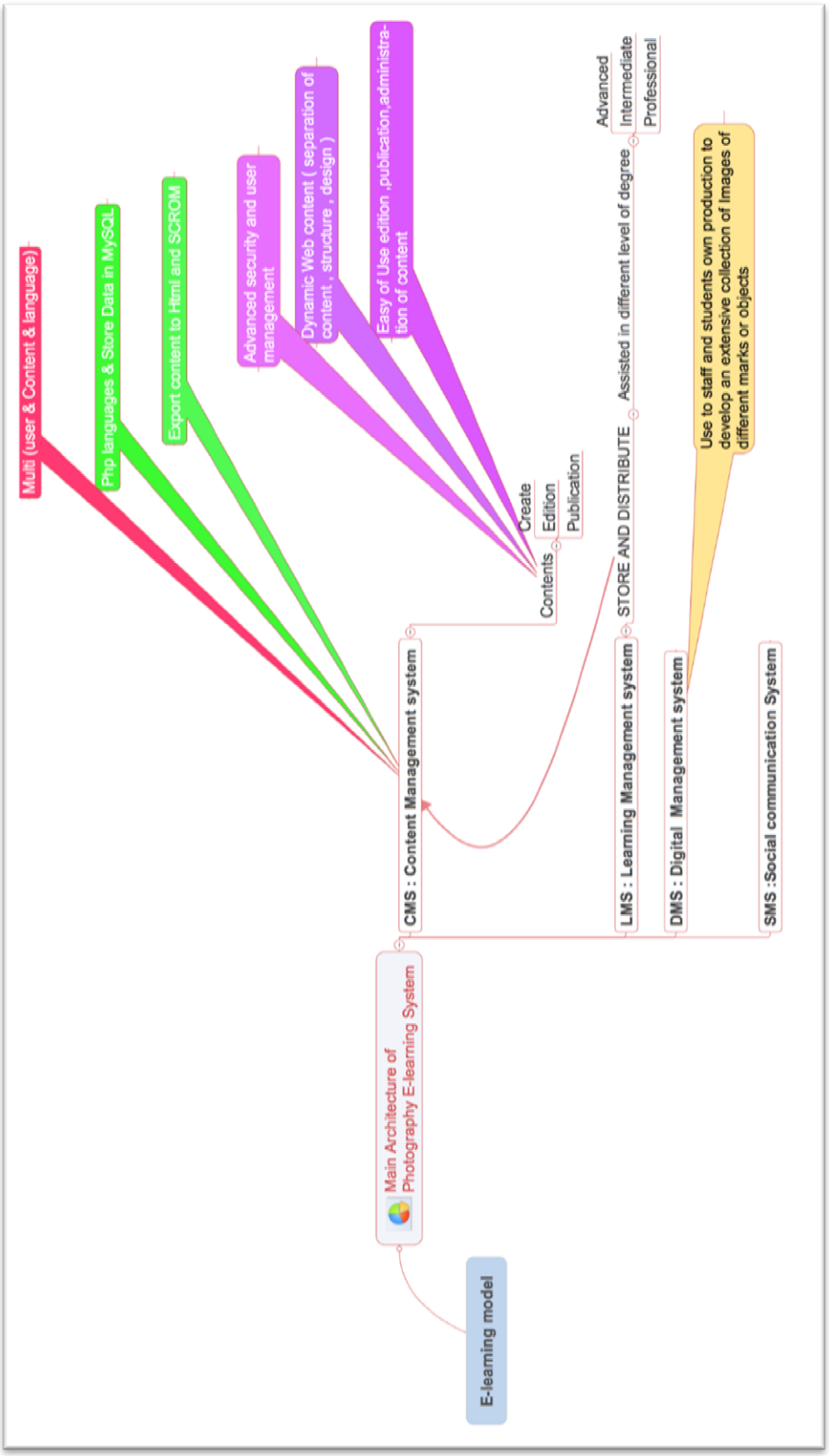


Figure 3.19: The Architecture of E-learning system.

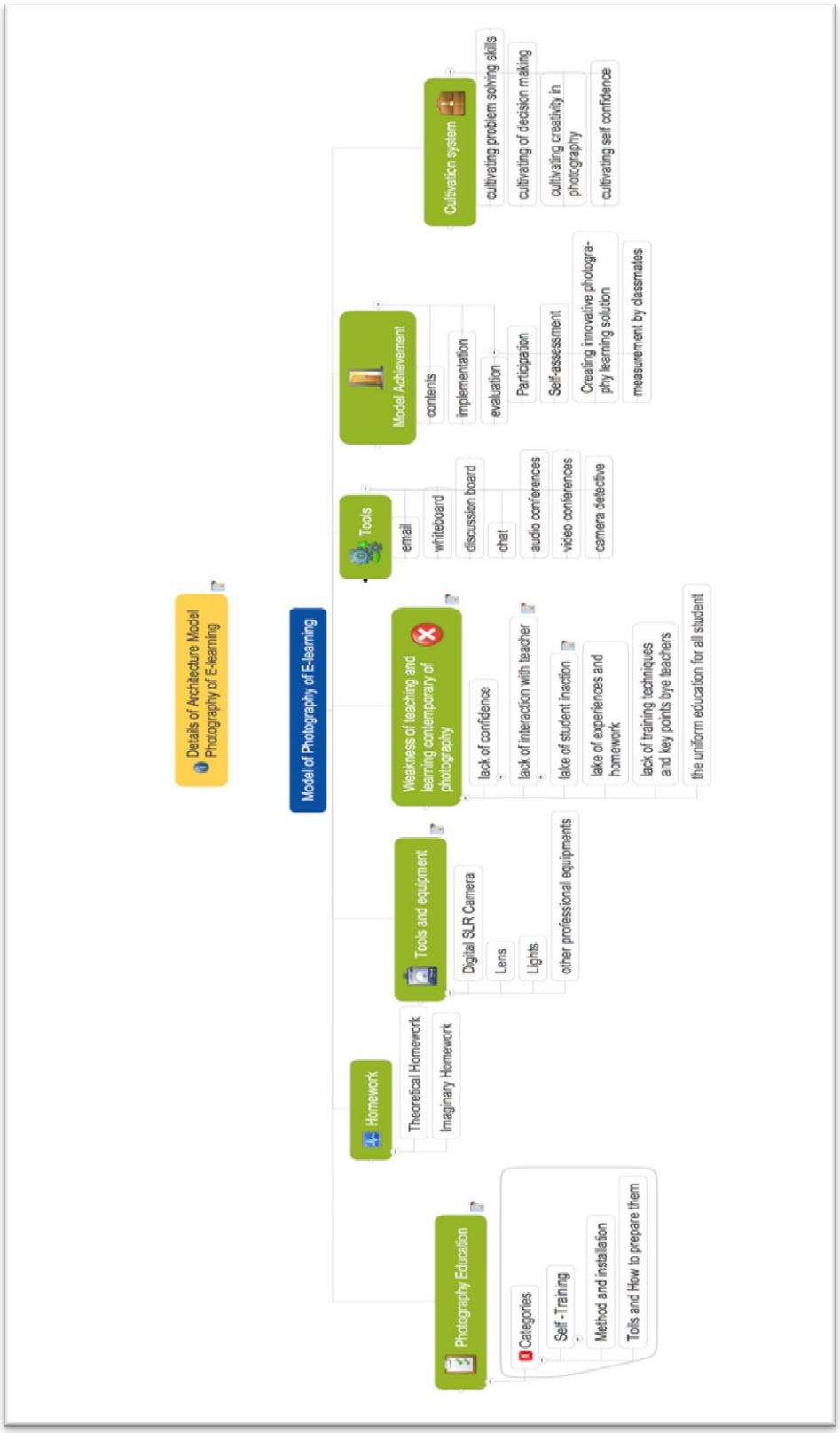


Figure 3.20: Developing Details of the System Architecture

Chapter 4

SIMULATION

In this simulation part of learning management system, results are presented in this chapter. The following lists covers all the structures and functionalities of our project components:

- **Rights**: User such as (students) and instructor such as (teachers/professors)
- **Dashboard**
- **Courses**
- **Assignments**
- Responses
- Grade book
- Forum integration
- **Schedules**
- **Calendar**
- **Bibliography**
- **Activity** streams

4.1 Registration

Registration on the system is divided to two categories

1. Student user: Student registering to the system can use the courseware with a student right.
2. Contributing user: contributors can register to the system to use upload feature for uploading their contribution with an up-loader (contributor) right in the system.

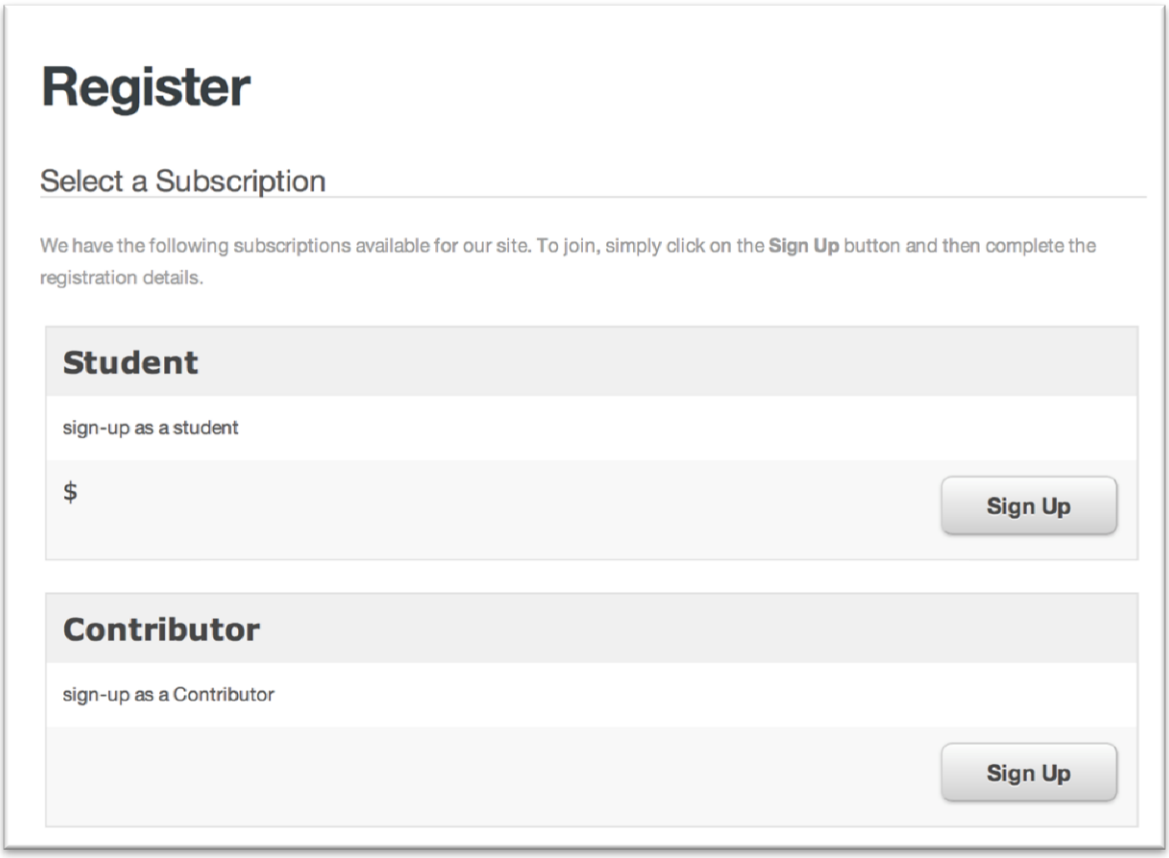


Figure 4.1: Registration part

Roles: Registration of users and instructors (Students and Teachers)

In courseware Tab, the segment named Courseware has several tabs, which including home, course description, assignment, and schedule.

The Courseware Tab uses custom right to differentiate between students and instructors. In the system, we have a custom setting which allow the administrator to assign another right if necessary.

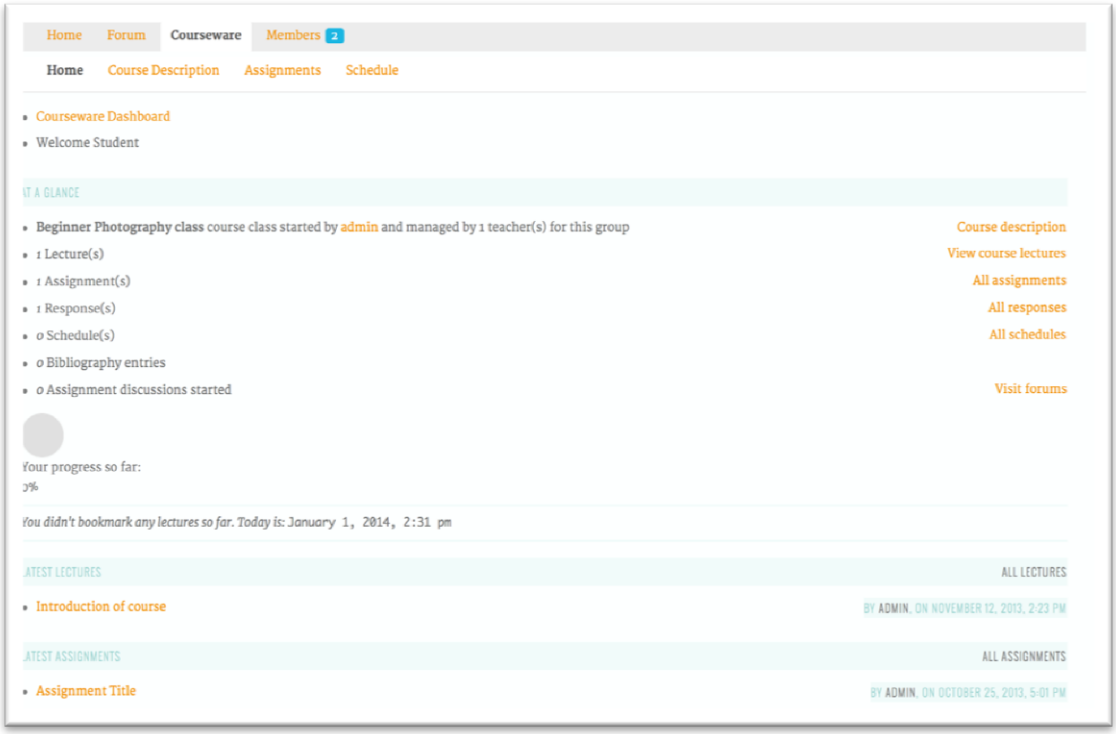


Figure 4.2: Courseware Tab

In the system, the user can make a request to choose his/her right by navigating to **Profile → Edit Profile → Courseware icon**. The user will find three options: Student, Instructor and Contributor.

After selecting one of the options, this will automatically send a request including your username and profile link to the system administrator. This will allow the administrator to assign appropriate right to the users. The administrator can also visit manually all profiles and can edit each user's role. The user can get a Teacher's right; administrator will cheek this after the user has acquired certain knowledge over a period of time.

The whole Courseware Tab is built on Group courses concept, in fact once you are connected, a group or a cluster can be named a Class of students. Courseware Tab can be used for different groups based on administrator settings. Each group has its own photography data; conceptual arts and other information such as booklist are shared with different users.

By default, Courseware will require both an instructor right such as teacher and, administrator role to be able to manage a class or group courseware. This means that a teacher will be able to directly manage courses when he gets the teacher right. Changing of the default setting is possible and it also allows an instructor to contribute to the contents of class. This can be done on the Course settings under Teamwork settings section.

4.2 Dashboard

Dashboard is a homepage for users such as students and teachers when users visit the Courseware Tab on Class page. The Dashboard concept is put in the system for students. It reflects all the class activity, student's progress, points and grades acquired. This is shown at the bottom of the page.

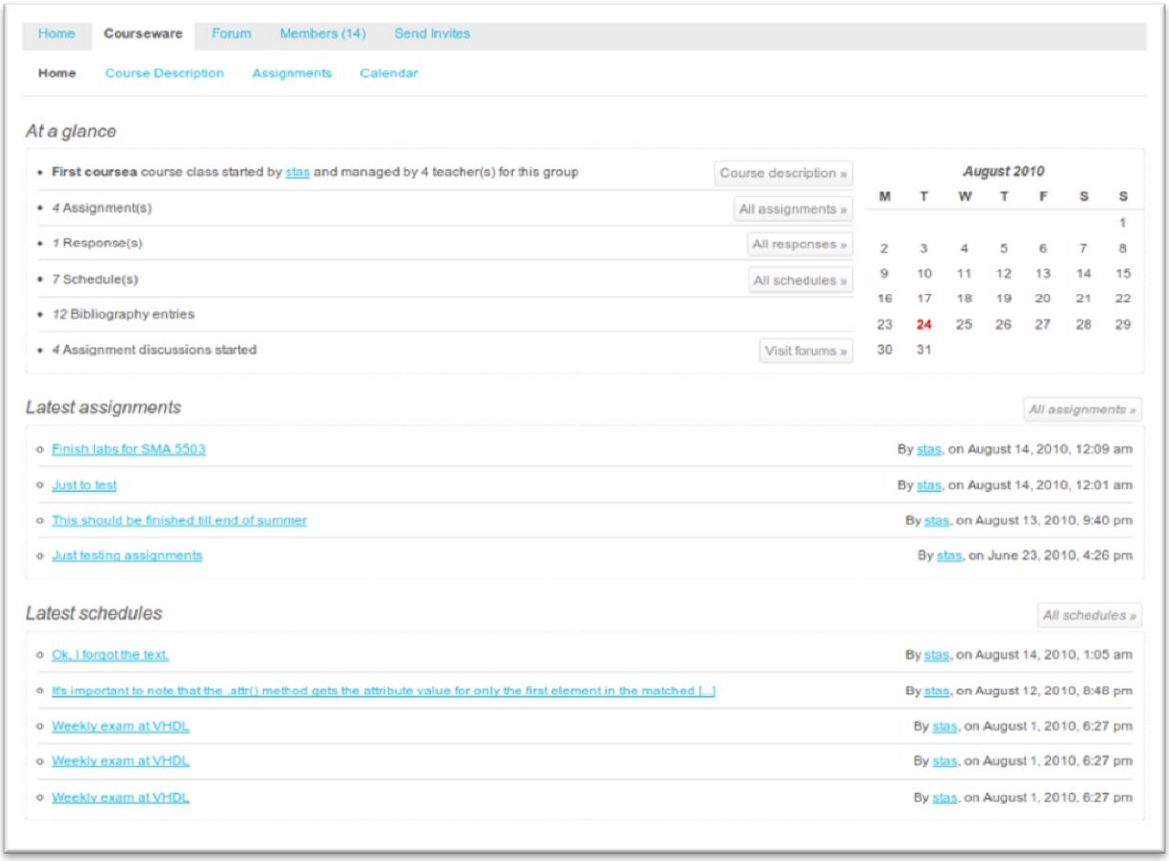


Figure 4.3: Dashboard Tab for students

For teachers, the dashboard will assist them to get the latest information about their students; user's activity and class contents. It will also provide links to add new content to class material.

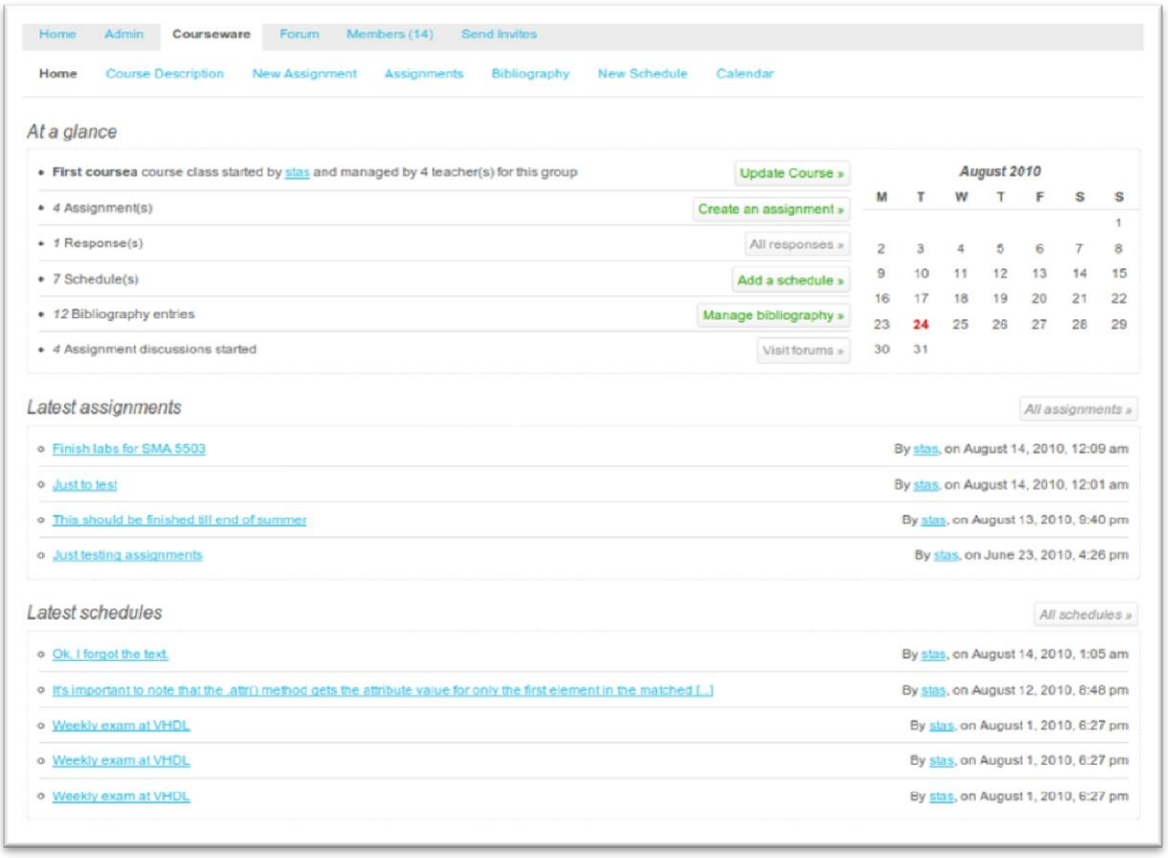


Figure 4.4: Dashboard Tab for teachers

4.3 Courses

The courseware part controls and manages the course. The main content type is creating a class; adding or updating a course. The courses content should reproduce the most important information and details for further class activities.

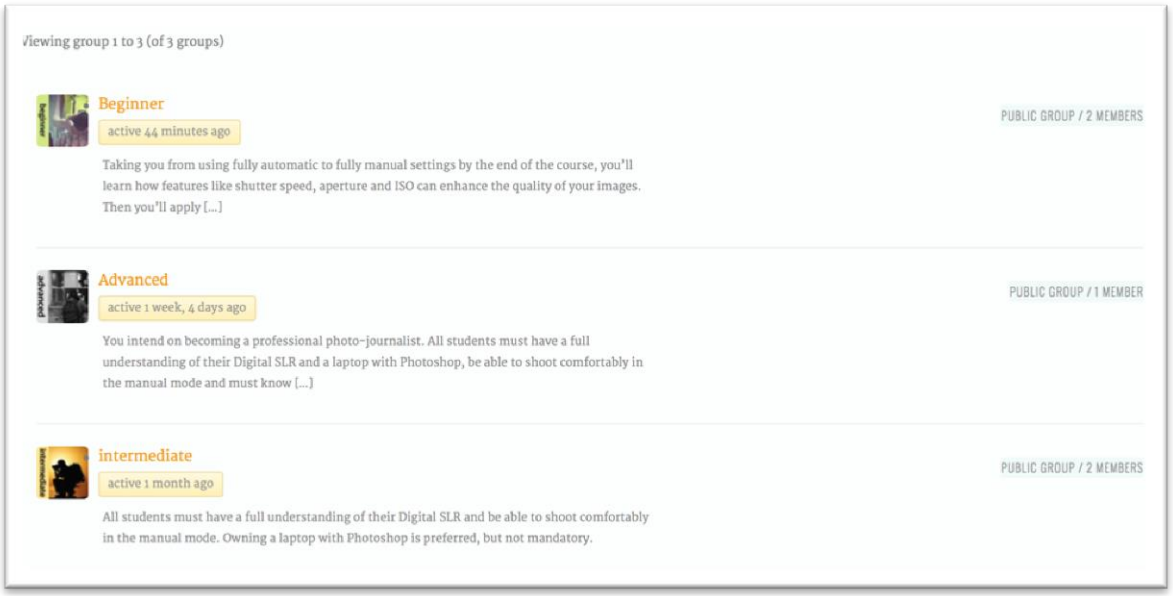


Figure 4.5: Bibliography listing in courses part

All Courses are integrated with the Bibliography part and the user won't need to add or drop bibliography notes for the content, after it is be added by using Bibliography button.

4.4 Assignments

The assignment part is for feedback. It contains different tasks such as homework, course exercises, projects, and theoretical notes when a teacher want's to notify the student.

Moreover, the student can upload text, video or photo depending on the type of the assignment. It is also integrated with Bibliography, so the user won't need to add and drop bibliography notes.

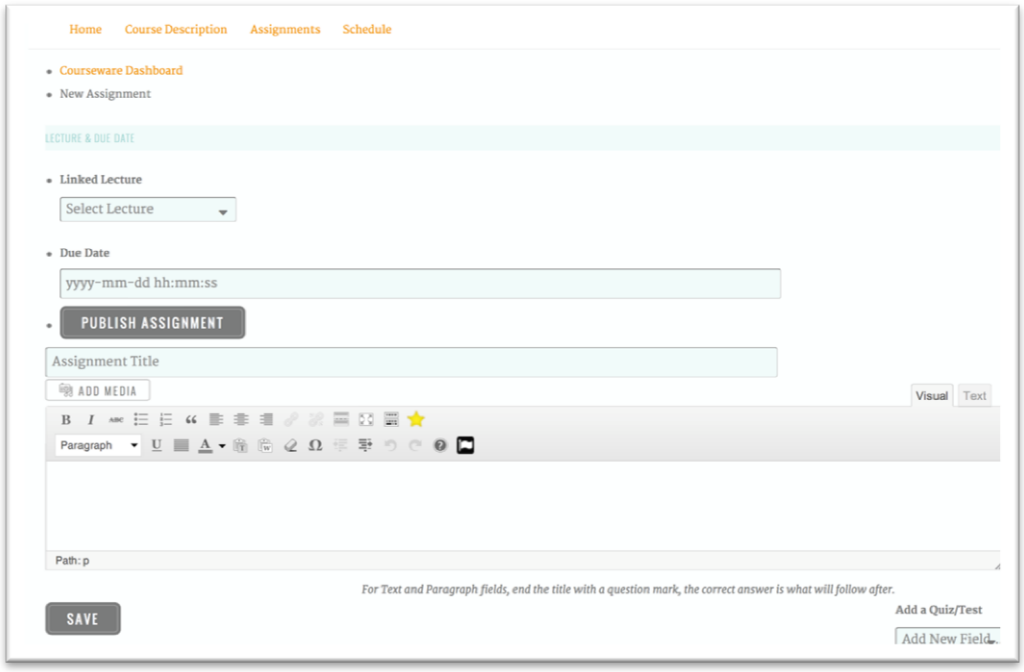


Figure 4.6: Assignments reply

Assignments will automatically assist to find the answers for students. Response to all assignments will be listed on assignment content by clicking the Response button on an assignment page. Students can find buttons to Add Response or Teacher's Response buttons on the assignment page. If a student did not add an answer yet, the

button will move the user to the editor's screen. If the user already added a response, and then he/her can review his response.

The response part creates a two-sided connection between the student and the teacher. After responding to an assignment by the instructor, the student's response can be used for grading. Teacher can put grades later; he can also check and analyze all students' homework and projects.

The evaluation policy differences between the face-to-face and the E-learning system is that the assignments can be checked at any point in time since it is all online, the schedule is also online as well as the notifications which can be accessed from anywhere. In the galley section, students can compare their work to other students work instantly. If at any point in time, the student needs help related to the system or the lectures, he/she can obtain it using the chat system that is available between the student, the administrators and the instructors.

Students can add only one response for each assignment, students are not allowed to edit or delete their projects.

The teacher/instructor gets a notification once a student submits an answer for an assignment. Teachers are not allowed to edit student answers, but they can delete them and leave a comment for the student as well. Also, with permission of the teacher, students can send new replies for the current assignment.

4.5 Schedules

This part was built like a timetable structure for students. Events such as exam, test, any announcements, timetable of online- class and important notifications can be seen here.

4.6 Calendar

Calendar is one of the dynamic parts of the Courseware section. It is used to connect all assignments and schedules section with dates, information with due dates and end dates. Calendar includes more details of data information about the assignments and schedules such as day, week, and month opinions. It also integrates contents with their email or Google Calendar settings.

4.7 Bibliography

The Bibliography system is used to add books or PDF files in the courseware section. Moreover, references are also included in the Bibliography part. Adding a book or an extra file on the courseware section is helpful for students to achieve more knowledge about photography studies beside the video content. The administrator has total control and can administer this process using the Courseware Bibliography Tab. The references such as articles or the books that are written by the author are not checked by the system for copyright issues. The references can be uploaded in two ways: they can be uploaded directly from the computer with the .PDF format, or by simply sharing a link. Provided that copyright issues are handled legally.

4.8 Activity streams

The Courseware part is strongly integrated with the activity stream, so as to produce a particular stream. The administrator can get an update or real-time notification of activities from different levels of classes as specified in the system (beginner, intermediate and advance level classes). The list of activity streams in Courseware Tabs is:

- Forum
- Courses
- Assignments
- Schedules
- Responses

These are visible on the class homepage.

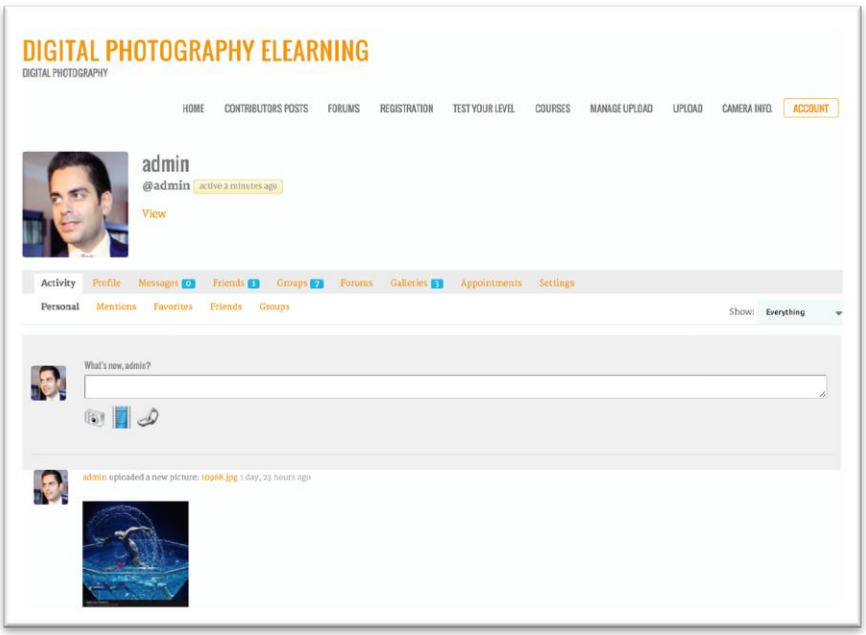


Figure 4.7: Activity part

4.9 Test your level

This part is created for students to monitor their knowledge level about digital photography. The user must answer 10 theoretical questions, which are categorized into four parts: Understanding Color, Portraits, Master Retouching & Masking and Critical Theory. Thirty-four points is assigned to the theoretical questions.

Besides that, the students must upload five photos to which sixteen points are assigned. Instructors are responsible for analyzing the answers and photos in each category (beginner, intermediate and advance). Students can be assigned to different categories based on the points acquired.

Figure 4.8: Test your photography Knowledge

4.10 Upload

In this section, contributors can upload their files, after which all users in the system such as student or instructor can vote and “like” the content. The content may include different types of media files such as Video and Audio. A title can also be assigned to the content, for instance “learning HDR photography”. The instructor approves the uploaded files by checking the standard as stated on the system (media size, quality, and good understanding on what is being taught in the media). Users can then use the content and rank them.

In this section, there is no algorithm or compression for encoding videos. Photos can be uploaded in TIFF, JPEG and PNG format with a maximum file size of 5MB. Videos can be uploaded in MOV, FLV and Mpeg4 formats with a maximum file size of 25MB. Copyright issues must be handled properly.

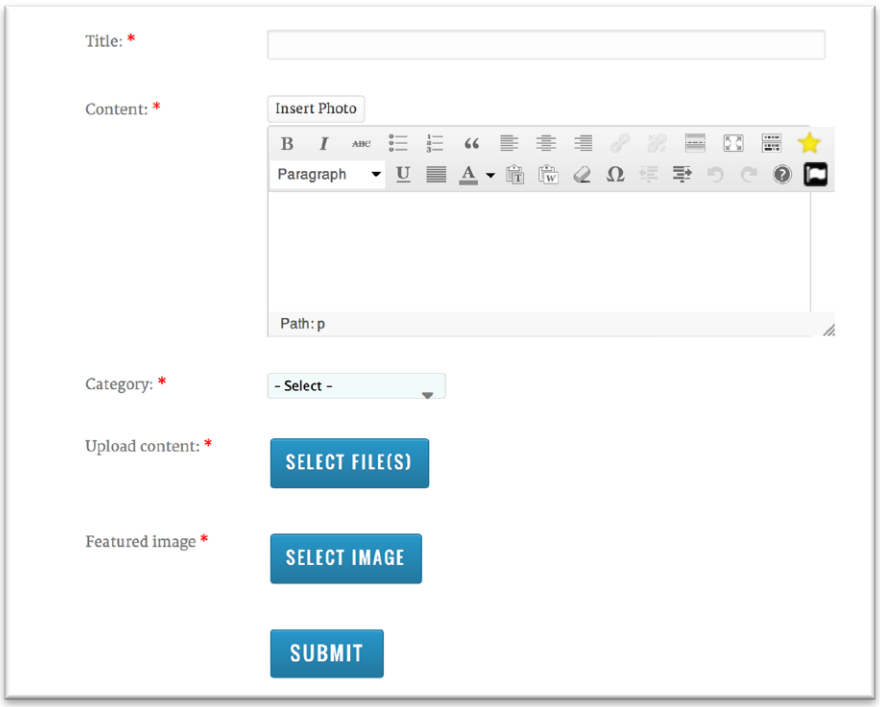


Figure 4.9: Upload part

4.11 Manage upload

This part of system gives freedom for contents to be managed after upload. Contributors and instructors can edit , delete or make other adjustments to their files.

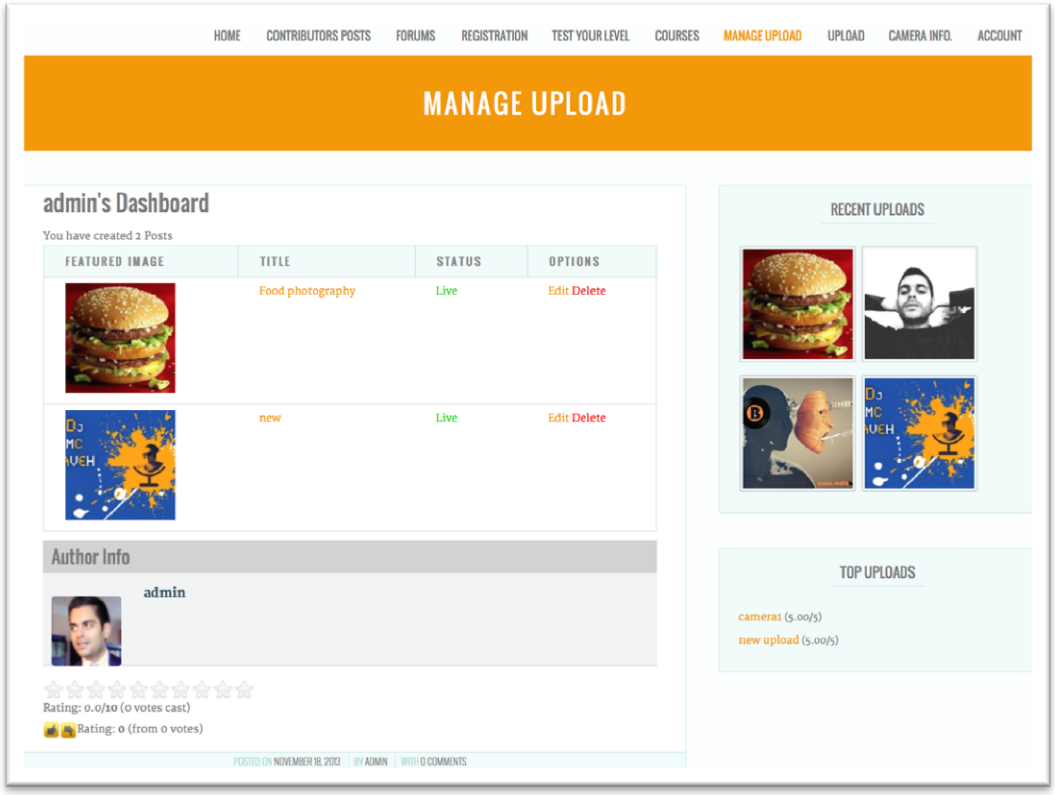


Figure 4.10: Manage upload part

4.12 Contributors Posts

After contributors upload and manage their files in the contributor Tab, all users in the system, such as students or instructors, can vote for or “like” the content.

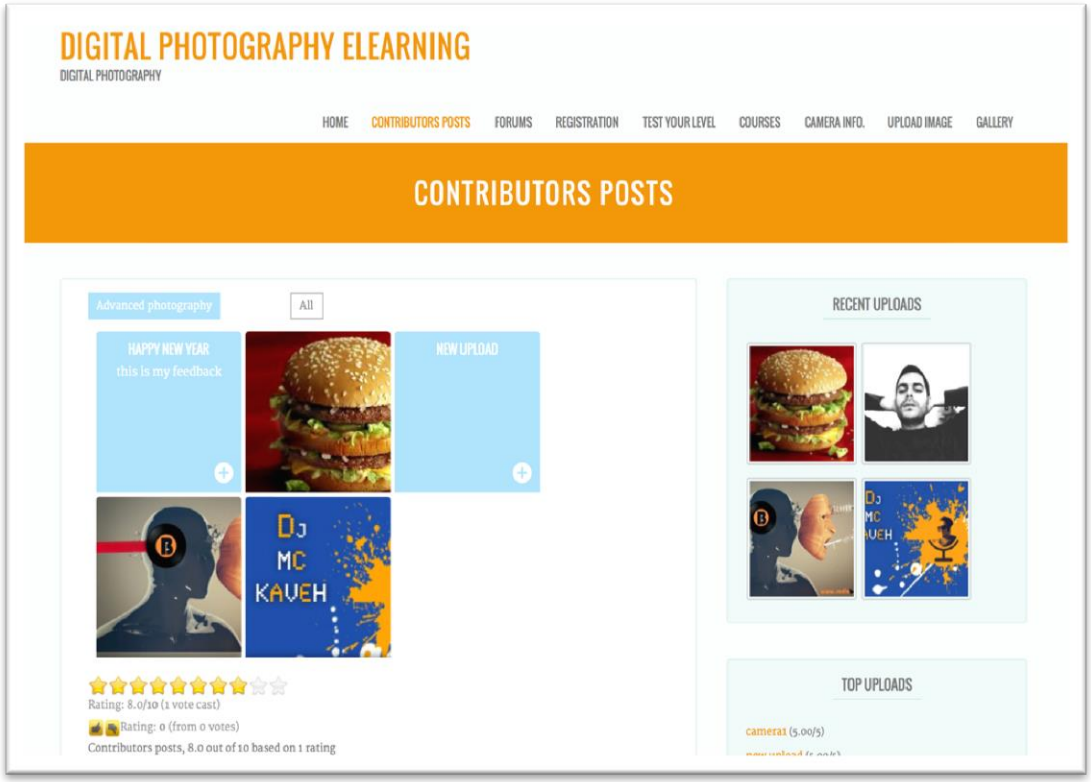


Figure 4.11: Contributors Posts part

4.13 Forum

Forum acts as the social network tools for the system, users can only use the forum after they are registered. Instructors can create new topics and post the subjects to the different levels of classes such as advanced class or intermediate class. Users can leave comments and share their ideas and opinions about a variety of topics. The control of this system is handled by the administrators and the instructors. The instructors give permission to students in order to be able to upload content.

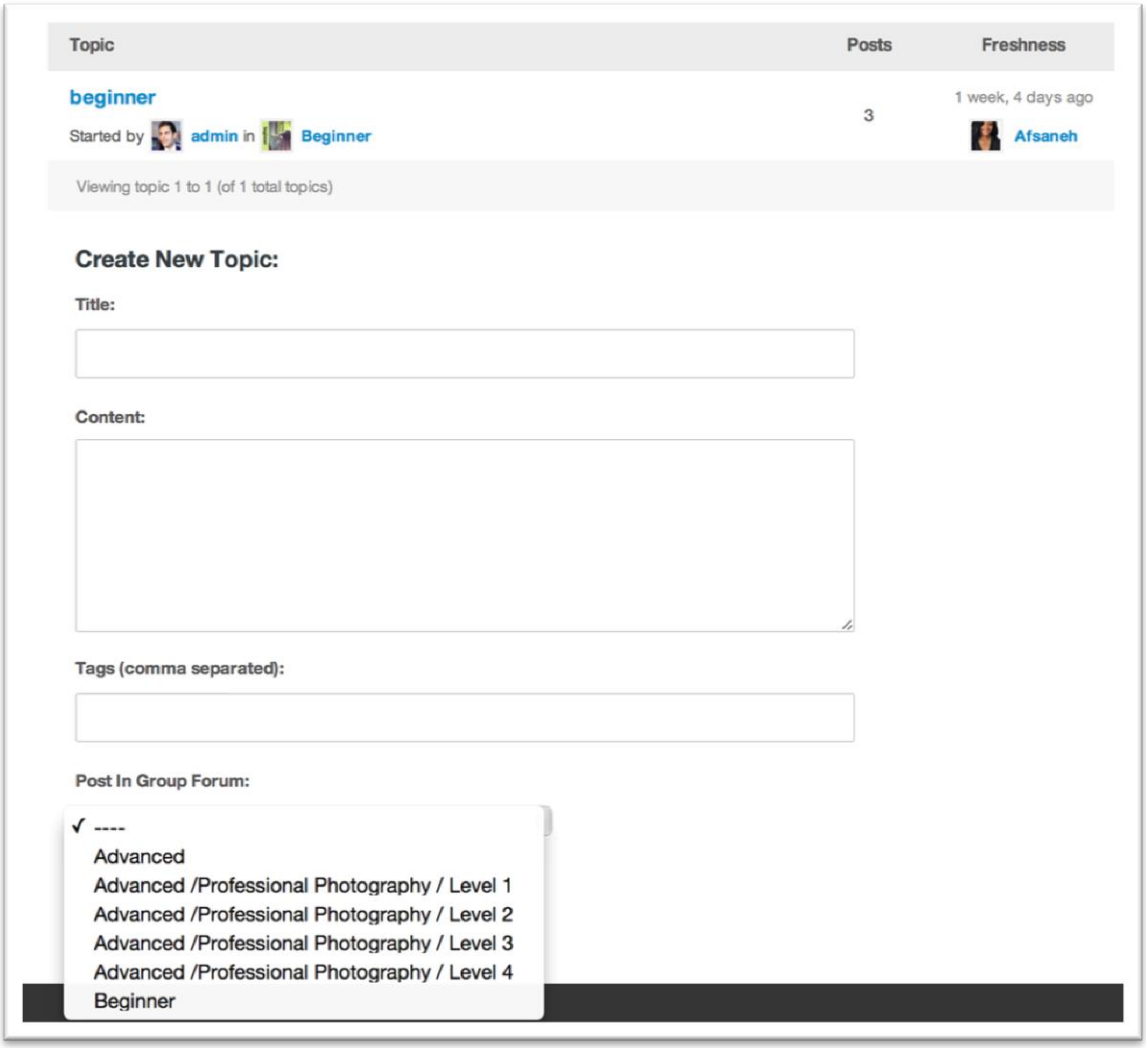


Figure 4.12: Mange Upload part

As a simple example, Afasaneh was one of students in the system, she uploaded a Adobe Photoshop topic in the forum section (Figure 4.13).In this part other students or instructors could leave messages and share their opinion about this study.

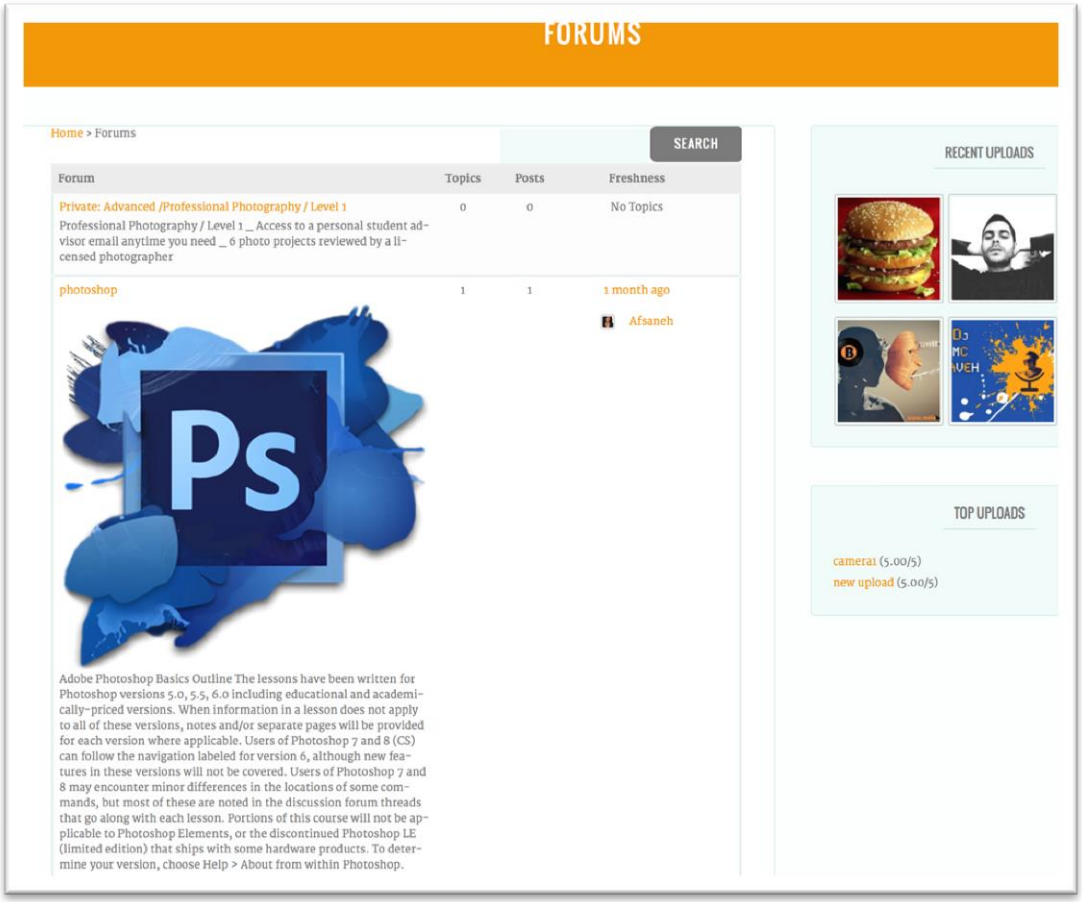


Figure 4.13: Forums interface for students

4.14 Chat

The aim of this part of the system is to create a connection between the registerd users. All the online questions from students can be answered via chat (real-time). The chat system includes tag items, emotion characters etc. The instructor and administrator control and permit the activities between all registered users.

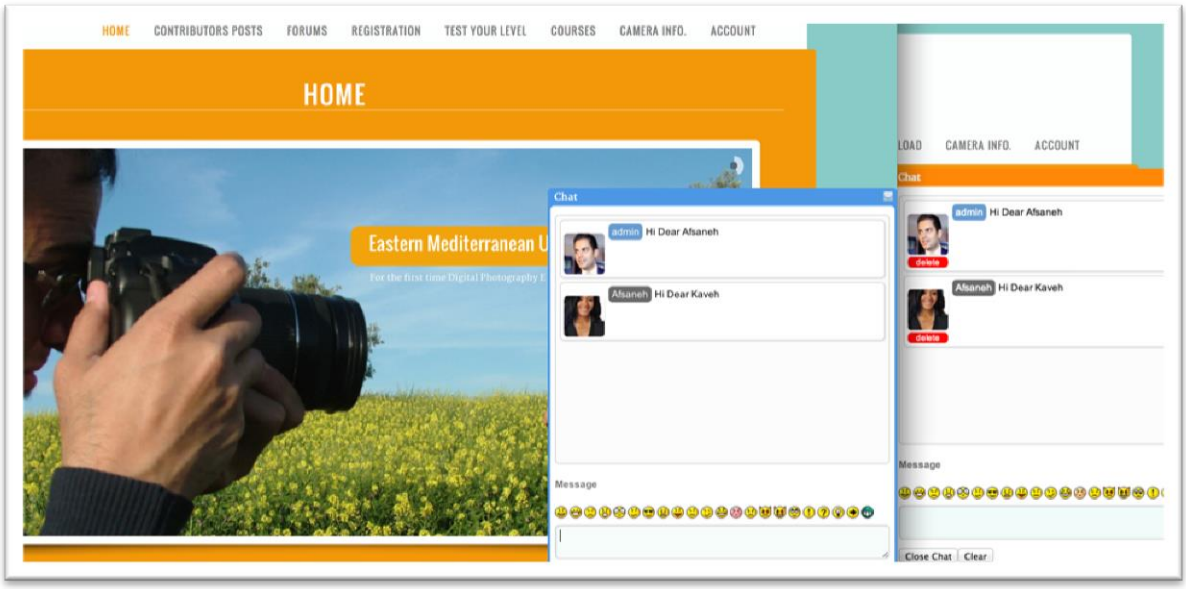


Figure 4.14: Chat system

4.15 Gallery

Gallery is designed to be able to create a social network between the users. One of the advantages of this user-activity is to let the users evaluate and rank student photos. All users can also leave comments and share their ideas and opinions about a variety of photos.

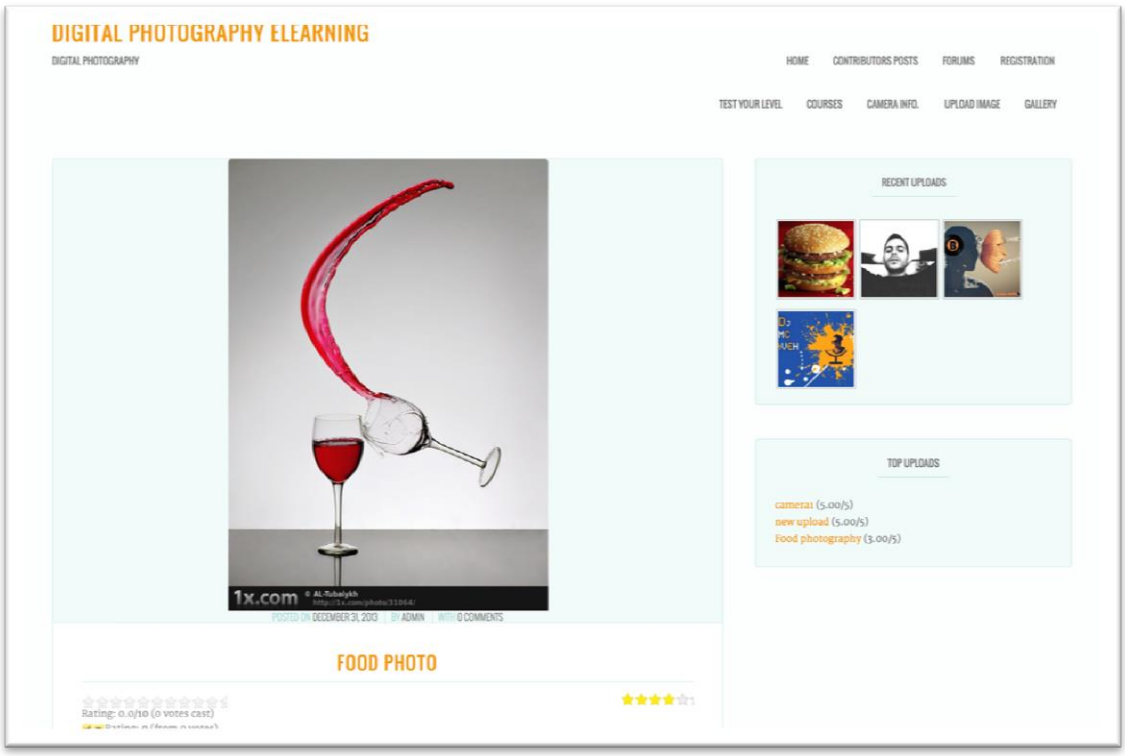
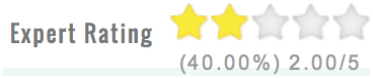


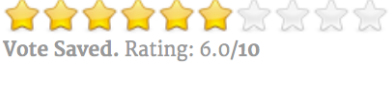
Figure 4.15: Gallery

The administrator and the instructor handle the control of the system. Voting of the system is divided into:

- Expert votes [handled by the instructors].



- Student's votes.



Students must upload photos with their signature in the photo gallery [Figure 4.16]. The terms and conditions contain the copyright rules for the system. Students can upload Photos with the JPEG and PNG format with a maximum file size of 5MB. For each day, users are restricted to 5 photos.

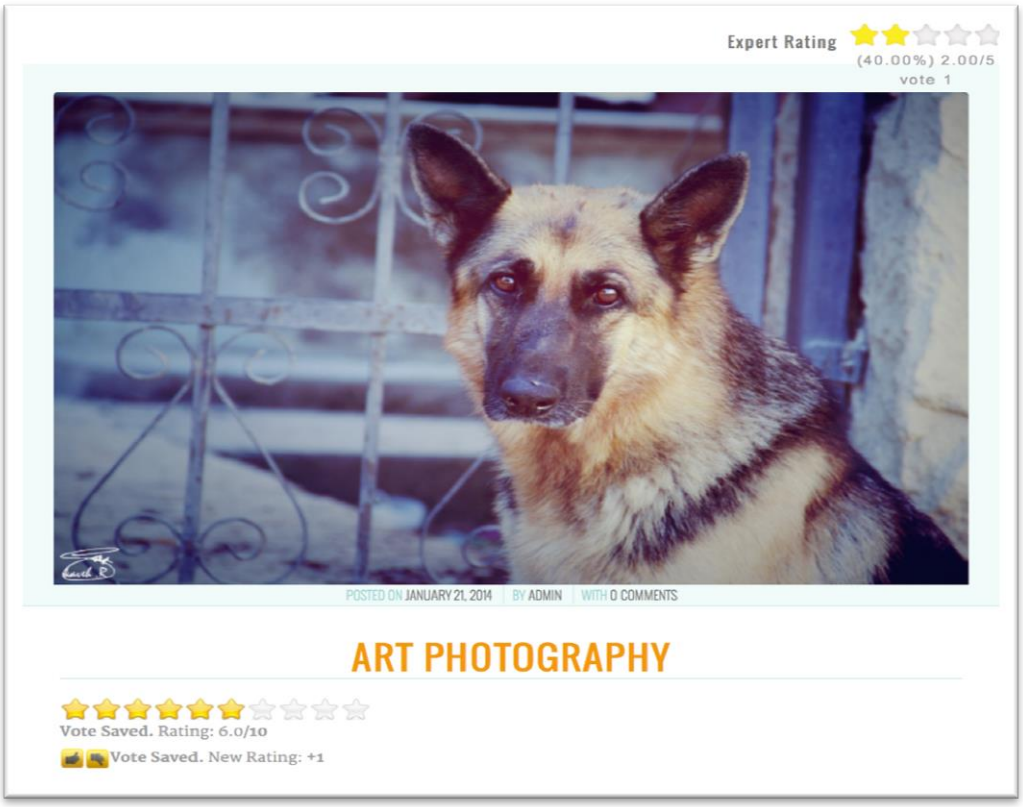


Figure 4.16: Example of photo gallery

4.16 Camera Information

This part is created for students and contributors to monitor the camera information and develop their knowledge about the current digital photography news and digital camera reviews. The instructor and administrator control the activities here. One of the advantages of camera information Tab is to let the instructors evaluate and rank the cameras.

Figure 4.17: Camera Information

Chapter 5

CONCLUSIONS AND FUTURE WORK

5.1 Conclusions

In this study, we aimed at designing an extensive, detailed system capable of supporting a photography E-learning program. The goal of the system is to present digital photography materials with some advantages compared to face-to-face programs. Our pre-assumption, in this work was the production and efficient use of online instructional materials, which constitutes a part of the learning process for a student.

After initial data gathering, literature reviews, and expert consultations, we determined some potential and actual problems, are opportunities related to photography E-learning programs are based the E-learning system design of these finding.

The Viable System Model (VSM), introduced by Beer, has been chosen in order to design the VSM system. Five different subsystems have been considered and identified for this study. We illustrated the details of each subsystem and their interfaces.

The budgeting part of the VSM is the most important point according to the organization structure as in E-learning education material maintenance has a higher

profile compared to material production which rejects the idea of a pre-determined, strict budget system.

Featuring the complexities of the online teaching environment and handling such complexities has a great importance. In this study, the complexity related to students, based on their visual and textual features, their gender, their desired material, existing knowledge, their time limitation, and their residency are illustrated. For handling the mentioned complexities, technological IT instruments, multimedia technologies, and also psychological tests, which are able to group the clients (hence reduce the complexity) and satisfy their demand have been designed and utilized.

Then, a brief assessment of the simulation of the model has been achieved. The simulated model has the following sections: Rights: User (Students) and instructor (Teachers/Professors), Dashboard, Courses, Assignments, (Responses, Grade book, Forum integration), Schedules, Calendar, Bibliography, Activity, (Streams, Support and Feedback recourses). Each section was presented in chapter 4 of the thesis in detail.

Additionally, a Test-your-self part has been implemented for those who want to determine their level of expertise in the system in order to find out whether that they can directly register for higher-level courses in our system. However, the system is designed to test the user's level. It does not need any prerequisites for registration in the basic level course.

In conclusion, based on the current economic situations in the world, establishing E-learning programs, particularly in visual art, is inevitable, as they seem to be

advantageous in both cultural and economic terms compared to face-to-face programs.

We have designed and simulated a digital photography E-learning program based on VSM. The result of simulation shows that an actual implementation for a photography E-learning program can be obtained that can handle the complexity of its environment in addition to possessing some features the face-to-face programs do not have, for instance: chat, gallery, forum and many others.

5.2 Comparison with Prior Projects

This research is aimed at designing a complete model of a photography E-learning program. As the other online programs in the market do not offer all the topics of photography, we could manage to present a model of such program for the first time. The proposed digital photography program can cover all materials from very basic and simple subjects to more advanced and practical ones. Moreover, the online photography program is adaptable to users' expectations and to their ability. For this, we have utilized multimedia technologies in order to classify users, which enable us to present our material according to users' characteristics. Up until this research was conducted, there has not been any similar publication or academic research covering the digital photography E-learning systems. For comparing our system, there are some websites and private systems created, but none of them are using a full E-Learning system and they are not using any Learning Management System (LMS) as well. Some websites of similar projects are:

- http://photo.net/photography-education-forum/00H6qt
- http://www.camerahouse.com.au/in-focus.aspx

- http://www.nyip.edu
- http://digital-photography-school.com
- http://www.shortcourses.com

Our model has its own shortcomings. Still, there is no guarantee that there can be some user's questions, which can only be answered in person. In fact, as studying the subject of photography is quite extensive, there is always a possibility for a student to have a question, which cannot be answered online on the screen, and he or she should be able to discuss with an expert face-to-face in order to learn efficiently. However, this subject is a difficult issue as the aim of this program is global and it may not be possible to bring students from around the world within the program Nevertheless, we believe that in the future, this issue will be solved, as we would have more developments in Information Technology, which enables us to hold online tutorial hours like we do in synchronous lectures.

5.3 Future Work

The system can be extended for use on mobile phones and tablets or any other small screen devices. The system can be imported to Moodle open source learning management system (LMS) in the future and made compatible with IOS and Android operation systems on mobile phones. The current system is based on an asynchronous design. In the future we may to develop a synchronous part as well.

Moreover, some facilities such as camera detective, which helps students, can be added to let the expert know concurrently what they are viewing through their camera. However, for same artistic subjects, it seems very difficult to implement an online system for painting, graphic design, sculpture, and etc.

We should be looking for more technological development, further improvements in multimedia industry, and new ways of education in general and art education in specific, in order to overcome the potential difficulties in education of other artistic majors.

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